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ABSTRACT

It is not always easy to get a naturalist to visit schools and it is often difficult to transport school groups to a state park. Hence, the Ohio Department of Natural Resources (ODNR) Division of Parks and Recreation developed Portapark to provide teachers with educational activities, techniques, and ideas. These activities are aimed specifically at the elementary grade levels, but are adaptable to other age groups and situations. They are designed to be interactive, hands-on, multisensory, and interdisciplinary and each activity is designed to meet a stated educational objective. Activities cover such themes as protective coloration, alternative uses for items, trash, environmental stewardship, nature's interdependencies, and adaptations. The packet begins with presentation ideas to help teachers understand important points for teaching in a natural setting. An activities overview section describes the format and offers tips for personalizing the activities. The activities section contains 13 activities, each of which includes a stated purpose, a materials list, activity ideas, and discussion questions. Activity extenders offer ideas to add to an activity when the activity hasn't filled the available time or when students could use a quick exercise to reinforce a previous lesson. These include games and trivia cards. The final section describes ideas for class projects, some of which can be extended for several weeks or throughout the year. (PVD)

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Portapark

ODNR, Division of Parks and Recreation
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Introduction

"Nature is man's teacher. She unfolds her treasures to his search, unseals his eye, illumines his mind, and purifies his heart."

—Alfred Billings Street

"I live in a very small house, but my windows look out on a very large world."

—Confucius

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I N T R O D U C T I O N

As an educator or youth leader, you are aware of the need to excite young minds in order to set the learning process into motion. What better place to excite than in an outdoor setting, and what better way to learn than by experiencing? It is not always possible to send a naturalist to your site, and we realize it is often difficult to transport your group to a state park. So, the ODNR Division of Parks and Recreation has developed Portapark to provide you with educational activities, techniques and ideas.

Portapark is aimed specifically at the elementary grade levels, but most of the ideas and activities are adaptable to other age groups and situations. Topically, the activities you will find here are similar to those offered through a number of other guides and programs.

Interactive, hands-on, multisensory and interdisciplinary—to the uninitiated, these words may sound like jargon; to the seasoned practitioner they may sound more like tired buzzwords which often get lost in application. At any rate, these words bespeak important concepts. Hence, we have tried to include these concepts in Portapark.

In developing a format that does involve a high degree of activity, we sometimes run the risk of it becoming only that—activity. The objectives can get lost. We hope that you will use Portapark to meet the activity objectives, to help meet your established curricular objectives and to enrich the learning experience. We further urge that you not teach just the facts but will help translate the concepts and give meaning to the interdependencies which connect all things natural.

To borrow an old cliche, "As the sapling is bent, so grows the tree." Indeed, young minds are formative. A major objective from our standpoint is to give the youth of today the knowledge and the ethic to become the informed resource stewards for tomorrow. Selfish—you bet! We know that informed stewards are good park users.

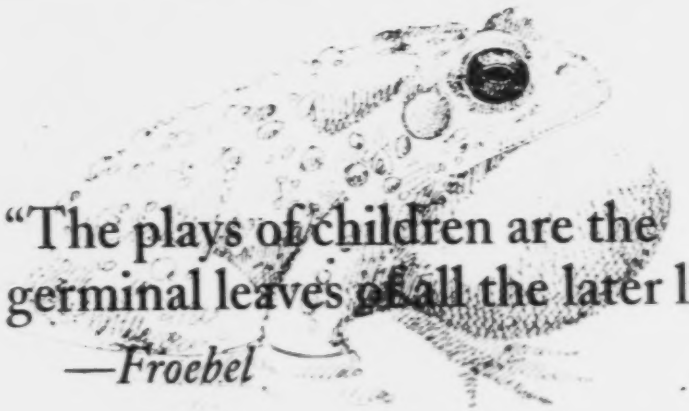
Presentation Ideas

Living Classroom Concept

Getting Control

Tips, Tricks and Gimmicks

Homemade Gadgets and Equipment



"The plays of children are the germinal leaves of all the later life."

—Froebel

"The child who works with material, not only makes things but he makes himself."

—Comenius

The Living Classroom Concept

Working with children in an outdoor setting is a new experience for many practitioners. Understandably, they have questions about the outcome of such a venture.

How will I control 30 second graders out on the trail? What if we don't have an outdoor area at our school? Don't I need identification skills for teaching about nature? How can I keep their attention and still make it relevant to our classroom curriculum?

The outdoor classroom can and does present a different kind of teacher/student association. There are new and different challenges to be met. There is also potential for a very valuable learning environment and an amazingly endless resource base from which to draw.

It has been said that play is the most complete educational process of the mind. During play, a child is self-directed and wholly involved. Through play, we actually experience. This is not to say that all learning activity should be playful; but by sometimes introducing the element of play into an educational activity, we can often promote learning by experience. Studies have shown, for instance, that good reading comprehension is based mostly on past experience rather than on textual learning alone.

These **Portapark** materials are usually given in conjunction with a workshop. **A basic premise of the workshop is that the ultimate success and effectiveness of any activity is strongly tied to the effectiveness of its presentation.**

We offer the ideas in this section to help make your presentations more interactive, multisensory and effective. Above all, we hope that these ideas will help spark many of your own.

Getting Control...

Nature has no lesson plan and often throws surprises at us when we least expect them. This can mean difficulty in maintaining attention and organization. It can also mean excitement and motivation, and these *teachable moments* are a savory advantage to the outdoor setting. Maintain control by capitalizing on these gifts—not by ignoring them.

You can generally expect a higher noise level in the outdoor setting. Do you classify your group's noise as mischievous or excited?

Some points to remember in planning and conducting your trip are:

- Develop a lesson/activity plan much like you would for the classroom.

  Organize your time from departure to return. It is often helpful to have some spare activities of varying length to fill irregular and unexpected voids (see section of activity extenders). Plan for flexibility.

- Prepare the students before the trip.

  Let them know what to expect of you and what you expect of them. Consider letting them help set some of the rules prior to the trip.

- Try to plan activities that actively involve all of your students.

- Deal with any disciplinary problems immediately.

  Make the punishment fit the crime, but don't be lax with corrective action where safety is involved.

- It is especially easy to engage in "control battles" with students on an outdoor trip.

  Try not to fall into the trap of constantly badgering the class to stay on the trail, etc. Set definite spatial and behavioral boundaries ahead of time. Try adding structure to an outdoor setting with ideas such as these:

  √ Use rope, yarn or chalk to define areas, sites or boundaries.

  √ Have students sitting when you are talking to them or giving instruction.

- √ Work in pairs or teams.
- √ Try incorporating mobile work stations that help give direction and structure.
- √ If working in scattered groups, make sure everyone knows your central meeting point, and regroup at planned intervals to discuss progress.

- If discipline is called for, single out the violator(s)—don't punish the whole class.

  Psychologically, it is much less effective to treat the group as a single unit. Selective reprimand has the advantage of letting non-violators realize their accountability without being punished. The same principle applies to reward and positive reinforcement.

- Nonverbal communication can be especially important in an outdoor setting where verbal communication becomes more difficult.

  Something as subtle as a hand on the shoulder or eye contact can bring participants into an activity and keep them involved as well as maintaining control. Along the trail or when arranging the group, try to pick vantage points which make you visible. Prearranged nonverbal cues can be helpful for conveying simple messages when the group is geographically scattered. In short, nonverbal communication is complex but powerful and can be one of your best tools if used properly.

- Promote good behavior by positive reward, and lead by example.
- Use a varied approach with plenty of visuals.
- Consider physical limitations of all participants in planning games or strenuous activity.
- General comfort factors can be especially important in an outdoor setting.

  If it is too hot, too wet or there are many bugs where you have chosen to sit, it's tough to get the audiance to listen well.

Tips, Tricks and Gimmicks

Everyone, without exception, has a set of interests and talents. These are assets which can be woven into a personalized presentation to give it special flair. Consider compiling an asset list which you can refer to when preparing to conduct an activity. This list should contain all of your hobbies, abilities and personal attributes—no matter how unrelated or trivial they may seem at the time. Some examples of assets which may show up on your list are:

gardening	**like to cook**	**play the flute**
backpacking	**know a local history**	**crochet class**
fishing	**can wiggle ears**	**belong to astronomy club**

Each time you prepare a presentation, skim your list to see what you might incorporate in one form or another. For instance, "can wiggle ears" may give you a good lead-in to a session about biodiversity or "play the flute" could spark a unique program on bird calls.

There are many tips and gimmicks which can help make a presentation more interactive. The following list is brief but may give you a few new ideas to liven up your outdoor studies. More importantly, we hope they will help spark your imagination.

1. **Hike variations** can help make a walk or activity more participatory. Here are a few which you may wish to incorporate:

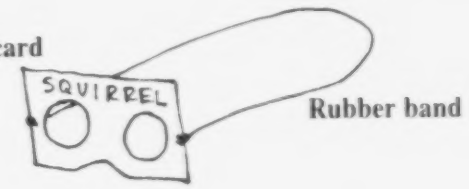
100-FOOT HIKE Lay out a short path with yarn or string. Participants can crawl through route while looking at those things which are small and often overlooked.

ABC HIKE Look for trail objects that begin with each letter of the alphabet or each letter of their name, etc.

PATTERNS, COLORS, SHAPES Compare; make crayon rubbings; discuss why certain colors, shapes or patterns might exist.

ROTATION At each stop, the person in front of the line helps in some way or leads the group. Afterwards, that person moves to the end of the line, and the next person becomes the leader.

ROLE PLAY Each participant assumes a different role (e.g., a farmer, a fish, a carpenter, a snail, a poet, etc.) and tries to see the trail from that perspective. Try using "vision cards" made from large index cards and rubber bands. Be sure eye holes are plenty large.



Vision Card

During the hike, have role players write what they need the most and what should be done with the trail area to help meet their needs. Form discussion teams. See which team can decide what might be done with the site to meet the highest number of needs for the most number of team members.

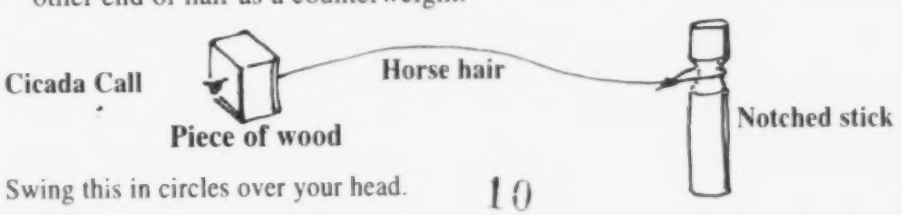
2. **A stethoscope** is one example of something you may happen to have which can make the outdoors come alive. Try listening to "dead" logs for sounds of boring insects, nest cavities, etc. In early spring, see if you can hear sap flowing.

3. **Animal calls** can help to make an activity more interactive and exciting. You can purchase commercial calls from sporting goods and department stores—or try making some of your own:

   • Teach students to make a squirrel's bark by sharply kissing the palm of the hand.

   • A rubber squeeze toy or sucking on the palm of your hand can imitate a small animal's squeal to attract predators.

   • Imitate a cicada's sound by knotting a 3-foot hair from a horse's tail around a notched stick. Apply rosin to the notch and tie a small piece of wood to the other end of hair as a counterweight.



Swing this in circles over your head.

4. **Scavenger hunts** are often overworked activities which can overwork the environment, depending on what is gathered. Try a sketching scavenger hunt which forces participants to draw or make crayon rubbings of what they are assigned. This has the advantages of leaving the site intact, making observation a part of the activity and providing the sketches as a basis for more indepth activity in class.

5. **A deck of name cards** can be made from 3" x 5" index cards with each participant's name on an individual card. Carry these along and shuffle them before an activity. Keep drawing from top of the deck to help assure that everyone is equally included in questions or other participation.

6. **Baiting** works for a number of animals. Sardines or table scraps left in likely viewing areas may attract raccoons and opossums. Peanut butter may get chipmunks and small rodents. Scent posts also attract a variety of animals. A scent post is simply a stake which holds a small jar or gauze pad up and off the ground to let the odor disperse. A piece of rancid meat or commercial scents give the odors. Many critters attracted to the site will be nocturnal and you may not see them in person. However, clear away leaf litter and sift the soil through screen wire and/or add a light coating of flour to help record tracks.

7. **Moths and other insects** can also be baited by painting patches of a fermented mixture of fruit, alcohol and molasses on tree trunks. Moths will come in large numbers at night to a white sheet illuminated by black light. Another twist on the idea of attracting insects at night is to construct a frog raft. Mount a battery light on a picnic cooler lid (or other small raft), attach a line and launch it in the frog pond (at night). The light attracts bugs which will sometimes attract frog riders on your raft.

8. **Face puppets** can be good "bridge builders" particularly for those kids who may be a little too shy to join in. A face puppet can be made from a coat hanger and a section of women's nylon hose.

Coat Hanger Covered with of Nylon Hose

Children can decorate the face to become geologists, etc. As you ask questions of the "famous face" (which the student holds in front of his own), you may be surprised at many of the answers you receive.

9. **Quadrat study plots** can be easily marked off with common items. For instance, a coat hanger pulled out to a square shape is about one square foot in area and the space inside a hula hoop is about one square yard.

10. **Making your senses more acute:**

SIGHT At night, look slightly above or below an object to see it better.

HEARING Try holding large plastic drinking cups with bottoms removed to your ear or cup your hands to your ears and listen in directions.

SMELL Try wetting your nostrils to increase the number of scent molecules you can pick up.

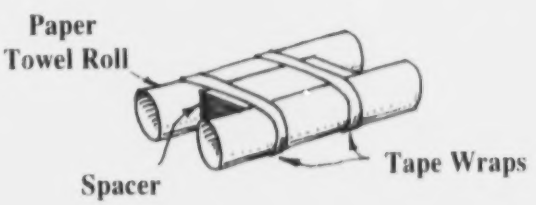
Homemade Gadgets and Equipment

Two reasons for not being able to acquire a piece of equipment you need for an outdoor activity:

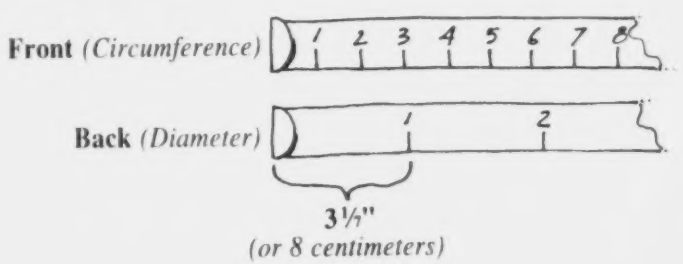
- Too expensive
- They just don't make such a thing

In either case, with some creativity and items found around the house, you (and your students) may be able to concoct some amazing tools. Following is a brief list of ideas. Most are not new or particularly unique, but they may help to spark your imagination to invent an extended list for yourself.

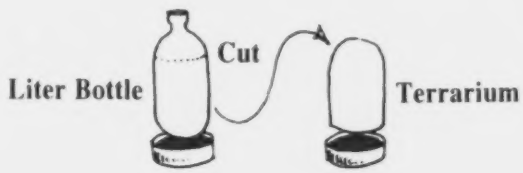
1. **Chummy scope** - For pointing out distant objects, one observer sights with right eye through left side of scope, other observer peers through right side of scope with left eye to see the same object. To make a chummy scope, tape two paper towel rolls together so they are parallel. Use a block of wood or other material to space the tubes apart about one eye's width.



2. **Diameter tape** - Make a cheap tree diameter tape by using a cloth measuring tape (like those you can get at a sewing shop). The side already marked in inches measures circumference. On the backside, mark off 3-1/7 inch units beginning at "0"—this will give the diameter.



3. **Everyday objects and discards** - An ordinary kitchen strainer can make a useful dipper for aquatic studies. Plastic liter bottles make good mini terrariums. (Remove the bottom piece, cut the neck and remove from the top, invert back into the bottom piece.)



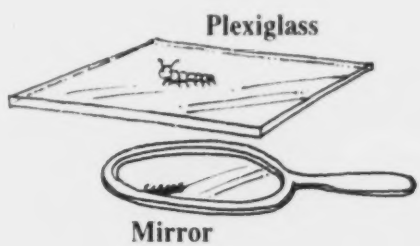
Egg cartons make good collection trays for rocks, seeds, etc. Small plastic bags filled with water are good for temporarily holding aquatic creatures to view them.

Tin cans become stargazers when spray painted black on the inside and holes for a constellation are punched through the bottom with a nail or awl. A can with a funnel in the top serves as a rain gauge. (To calibrate the amount of rain in the can which represents inches of actual rainfall, use the formula below.)

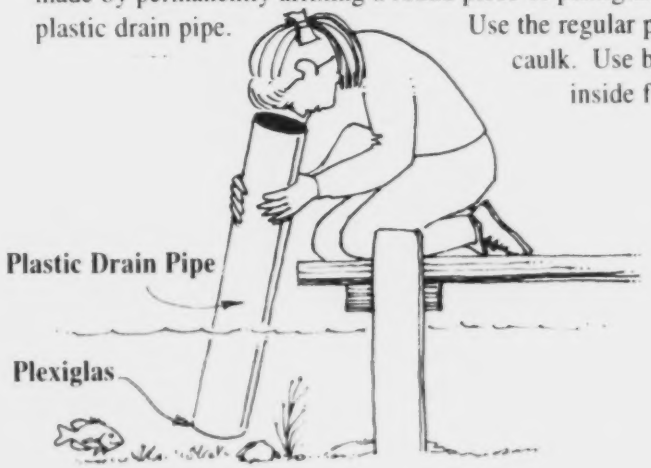
$$\frac{\text{diameter of funnel}^2}{\text{diameter of can}^2} = \text{height of 1" of rainfall}$$

4. **Plexiglass** - Keep spare pieces of plexiglass. They can be used with a grease pencil or crayon to trace leaf shapes, cloud patterns, etc. With a small mirror, a piece of plex also makes a good locomotion detector. Place caterpillars or other small critters on the plexiglass, and angle the mirror underneath to observe how the creatures move from below.

Locomotion Detector

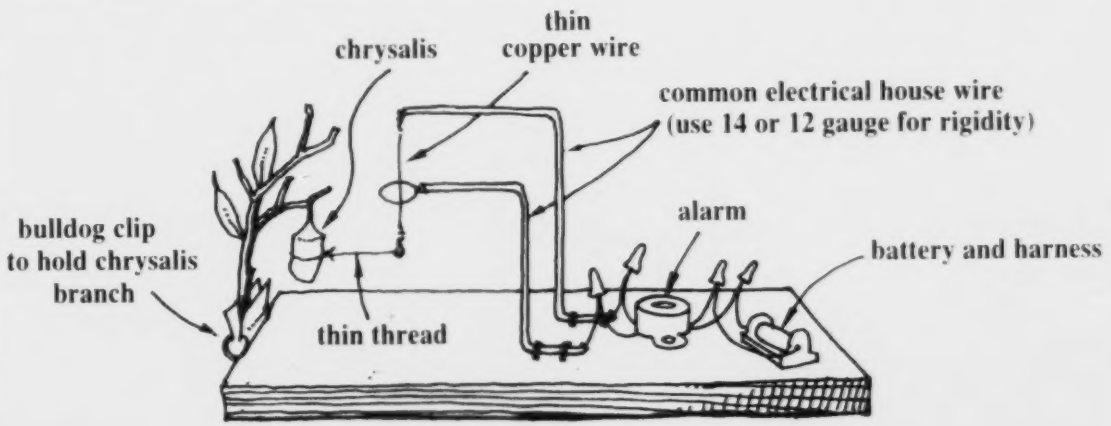


5. **Underwater viewing scope** - This can be made as simply as taping plastic wrap to the bottom of a tin can with both ends removed; or, a more elaborate model can be made by permanently affixing a round piece of plexiglass to one end of a length of plastic drain pipe. Use the regular plastic pipe cement or a silicone caulk. Use black pipe or spray paint inside for best viewing.



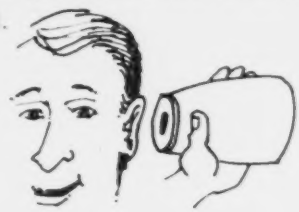
6. **Blindfolds** - A number of activities can call for a batch of blindfolds. To make some that are both effective and durable, cut carpet remnants into strips. You can get creative by adding features such as ears and eyes. Punch a hole in each end and tie on a length of elastic webbing. Wear with carpet side in for comfort.

7. **Chrysalis Alarm**—if you are trying to hatch a chrysalis, you can build anticipation by building this alarm from very inexpensive materials. A small buzzer or alarm and a battery harness can be purchased from most electronic supply shops for under ten dollars. Tie a slip knot in the thread attaching to the chrysalis, and keep snug, but not tight. As the chrysalis begins to hatch (and gyrate) the smaller suspending wire will touch the sides of the larger loop to complete the circuit and sound the alarm.

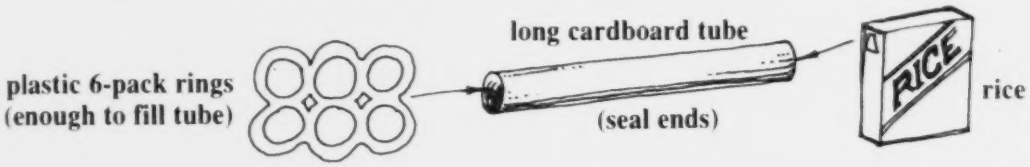


8. **Track Stamps**—Make track stamps by cutting the track shapes from inexpensive foam shoe insoles. Glue with contact cement to blocks of wood (foam side out) and ink with a regular rubber stamp inking pad.

9. **Animal Ears**—Many animals have ears with a parabolic design to help focus sound. Demonstrate this by using plastic cups with holes (about an inch in diameter) cut into the bottom. Cups with rounded sides work best.



10. **Rain Sticks**—Some innovative teachers have found a way to use plastic beverage can rings to make a very easy and inexpensive version of the ever-popular "rain stick." Stuff the six-pack rings loosely into a cardboard towel or wrapping paper tube, add a handful of rice, tape over both ends, and decorate the outside.

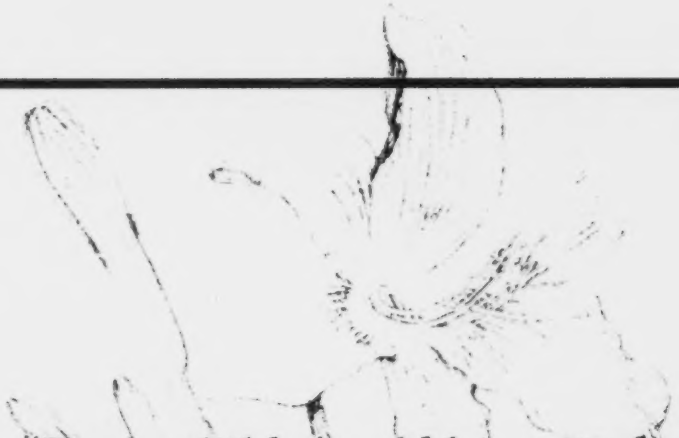


11. **Frog Raft**—Something different to try at night if you have good frog pond is to build a frog raft. A styrofoam cooler lid with a battery operated camping light mounted in the middle works well. Attach a string, and give it a shove. The light attracts insects which may attract frog "riders."

12. **Before and After**—old vertical blinds can be used to show contrasts, answers, associations, etc. For instance, a habitat painting on one side may reveal the animals that live there with the flip of a chain.

Notes

Overview of Activities



"Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs, mud-turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water-lilies, woodchucks, bats, bees, butterflies, various animals to pet, hay fields, pine cones, rocks to roll, sand, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best of his education."

—*Luther Burbank*

Using PortaPark . . .

The Activities

We have tried to provide a format for the Portapark activities that will make them convenient and easy to prepare and follow. Each activity is arranged like this:

Gives a brief description of the activity's objective.

Activity Title

Activity number here

List of any materials or equipment needed

Introductory information includes key words marked in *bold italics*. These can be referenced with the environmental terms list that is included here in the activity overview.

Includes "How To" steps for the activity. May also include extended activity ideas.

Lists pertinent questions for use as follow-up.

(Trivia Cards that may go with activity are listed here. Those numbered in bold are a primary source. The trivia cards are in the Activity Extenders Section.)

A C T I V I T I E S

Making Sense of It All 4

Materials:
blindfolds

PURPOSE:
To learn to use senses other than sight and to increase the powers of observation.

Man is a sight-oriented organism. This sense is so highly developed, and modern man is so far removed from nature, he tends to use this sense to the exclusion of all others.

We commonly see hikers in a park who consistently walk by some of the most interesting treasures nature has to offer. By using their senses and better powers of observation, they would not have passed them by.

Activity Ideas:

1. Select a natural item, one for each blindfolded member of the group who are seated in a circle. Number the items for identification. Give an item to each member and have them familiarize themselves with the item. Collect the items and pass them around the circle, having each person identify his by touch, and keep it as it comes to him.

2. Divide the group into pairs. Blindfold one member and have the other lead them around a designated area. Have the blindfolded member identify items by touch.

Discussion:

1. Why do animals have wet noses? Have you ever seen an animal lick its nose? (Moisture helps trap scent molecules.)

2. Why do many animals have whiskers? (Hint: look up the word "tactile")

3. Think of other adaptations that increase or facilitate the various senses. How can we develop these?

See Trivia Card **4** & 8.

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Personal Key

To personalize Portapark to your needs, there is a keying system that follows in this section.

First, the Table of Contents for the Activity Section can be completed to help blend these materials with your own and to help make them more readily applicable and accessible for your curriculum needs. It contains a check list for subjects and a column for noting more specific topical areas to which the activity may apply.

The Subject/Theme/Topic Cards can help to give a more detailed reference. They can be used to classify by subjects (i.e., math/language arts), by theme (i.e., "my neighborhood") or by topic (i.e., plants/adaptations). From there, under each heading, you can list applicable activities and their numbers and curriculum objective codes that can help in lesson planning. There is also a column for notes where you may want to list other reference materials, page numbers, resource people, helpful hints, etc.

A C T I V I T I E S O V E R V I E W

Table of Contents

Act.#	Activity	Subject				Topics . . .
		Math	Social Studies	Lang. Arts	Science	
1	Sock Hop					
2	Litter Legacy					
3	My Favorite Things					
4	Making Sense of It All					
5	That's Your Opinion					
6	Hide and Seek Animals					
7	Survival on a Shoestring					
8	Take Out the Trash					
9	What's the Difference?					
10	Land Lasso					
11	Eating Like a Bird					
12	Snake Holes					
13	A Slick Resource					
14						

Subject/Theme/Topic: _____

Curriculum Objective	Activity	Act.#	Notes (Could be used with/for/as part of...)

Subject/Theme/Topic: _____

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Word List

adaptation - the process of making adjustments to the environment

biodegradable - the ability of a substance to be broken down by microorganisms into simple compounds

carnivore - meat-eating animal

carrying capacity - the total number of animal species that a given habitat area is able to support

chlorophyll - a group of pigments that produce the green color of plants

cold blooded - animals whose body temperature changes with their surroundings

conservation - the wise use of natural resources over time

deciduous - trees or plants that shed their leaves

decompose - decay, rot; to break down into organic matter

diurnal - active by daylight (referring to animal habits)

diversity - variety, having a variety of forms or qualities

ecology - the study of organisms and their relationship to their environment

environment - natural and manmade surroundings or conditions

erosion - to wear away by the action of water or wind

habitat - the arrangement of food, water, shelter and space suitable to animal needs

herbivore - plant-eating animal

invertebrates - animals without a backbone

limiting factors - natural or man-made conditions that directly affect an animal in a negative manner such as disease, pollution, hunting, weather, etc.

migration - the movement of animals from one area to another and back again

natural resources - materials supplied by nature

niche - a specific place or role a plant or animal finds appropriate in an ecological community

nocturnal - active by night (referring to animal habits)

non-renewable resources - substances such as oil, gas, coal, copper and gold which, once used, cannot be replaced

omnivore - animal that eats both plants and meat

ozone - protective layer of gases in the earth's atmosphere

photosynthesis - the process by which leaves produce food for the plant using the sun's energy, water and carbon dioxide

predator - animal that hunts and eats other animals

prey - animals that are hunted and eaten by predators

recycle - to prevent waste by using materials more than once, to salvage used materials

reforestation - the replanting of trees in forests that have been cut or burned

renewable resources - living resources such as trees which can be replaced

solid waste - all items thrown away after use in a solid state that must be collected and disposed of separately

vertebrate - animals with a backbone

warm blooded - animals whose body temperature stays constant

wetland - any land area that is regularly wet or flooded

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Activities

"Play to the child is growth--the gaining of life; to the adult it is recreation--the renewal of life. It is doubtful if a great man ever accomplished his life work without having reached a play interest in it."

—Joseph Lee

". . . activities are interesting but the interest is not the aim; it is just the means to the two great ends of acquiring useful knowledge and cultivating a social disposition."

—Herman H. Horne, Philosopher

Sock Hop

1

Materials:

strainer or fine mesh net, double-sided carpet tape, old socks, toy parachute, pinwheel, velcro, baggies, glue, paper, index cards, pencils

PURPOSE:

*To study the importance of seed dispersal and unique **adaptations** that make it possible.*

On some days in Ohio State Parks, a shower of seeds bombards the hiker. These seeds come in all shapes and sizes with some amazing ***adaptations***.

Grenade-like, the mature pods of jewelweed explode at the slightest touch, scattering seeds in all directions. The winged fruits of maple trees launch an airborne attack.

Dandelion and cattail seeds float on billowy parachutes. Some seeds use hand-to-hand combat to attach to unsuspecting hikers. Visitors arrive at the park with clean clothes and leave with hitchhiking seeds hanging from their sleeves, socks and pants.

This activity works best during the late summer or fall when most seeds ripen. It can be used as a hike or done in a few minutes in any section of high grass or field near the playground. Also, it can be a good homework assignment.

Activity Ideas:

1. To gather seeds, old socks will be placed over shoes or on arms.

2. Have hikers brush the sides of the trail with their legs and arms to gather those seeds that stick.

3. You can use pieces of double-sided carpet tape on index cards to pick up seeds that don't stick. Use a fine net (a piece of women's nylon hose affixed to a hanger will work) to pick up floating seeds such as milkweed and dandelion. Pick up large seeds by hand.

4. Using toy parachutes, pinwheels and other gadgets, compare the way seeds travel to familiar toys. Let students match seeds to toys and experiment with them.

5. At the end of the hike, divide a piece of paper into categories of dispersal: "Fliers", "Floaters", "Hitchhikers", "Other". Glue samples of seeds in appropriate places. Comparison drawings of parachutes, pinwheels and hitchhikers can be added to the chart.

6. Also, seeds remaining on one of the socks can be sprouted by placing the entire sock in a pan of shallow water.

7. As a writing exercise, have students keep a diary in first person telling their life story if they were a seed.

Discussion:

1. While some seeds depend on wind or water for movement, others hitch a ride. Some need to be opened by heat or will not germinate until they have passed through an animal's digestive system. Discuss adaptations and the interdependent relationships which are important for seed dispersal.

2. Challenge students to think of seeds that we raise (grain, beans, sunflowers, etc.). How are they used (food, oil, fiber, feeding birds, ethanol, etc.)? What effect do these have on the world economy and why?

See Trivia Cards **5** & 9.

Litter Legacy

2

Materials:

onion sack, organic items, non-organic items, chart, pencil, writing pad

PURPOSE:

*To compare **biodegradable** litter to **non-biodegradable** litter and to study how nature effectively recycles itself.*

The problem with litter is that many items cast aside are often here today and not gone tomorrow! For instance, orange peels are **biodegradable** and decompose in about one or two weeks. However, styrofoam coffee cups never really decompose! When many discards breakdown, they leave harmful by-products.

Nature, on the other hand, is a master of **recycling**. Its leftovers provide food, building material, fertilizer, etc. to perpetuate its processes. Even **scavengers** draw their lifeblood by serving as natures's garbage men.

Activity Ideas:

1. To begin "Litter Legacy," plan a hike or demonstration that will show participants the decomposition of a tree. Find a variety of logs and trees that are in different stages of decay; ask students to guess the age of each. Discuss the concepts of recycling and composting as they relate to nature.

2. If you are carrying a bag lunch on the trail, have students sort and list their trash when finished into these categories: RECYCLE, REUSE, COMPOST PILE OR GARBAGE CAN. Next, have students label columns on a sheet of paper with these same categories. As you look at natural items along the trail, have students list each in one of the columns. Examine results when done by comparing lists from lunch and the trail. Where do the items labeled for garbage in our lunches ultimately go? Where does nature's garbage go, and what are the "garbage men?"

3. Use this idea as an extension of "Litter Legacy." At the beginning of the year, put biodegradable items such as an apple, dead leaves, etc. in a mesh onion bag. In another mesh onion bag, place non-biodegradable items such as cans, paper and styrofoam. Record the items in each bag and bury both in a hole that won't be disturbed. These bags will be unearthed several times during the year. Each time

you dig up the sacks, compare the natural (biodegradable) items to the "litter" (non-biodegradable) items. Have participants note the stages of decomposition on a chart such as this one (drawings or descriptions can be used):

	Items	Before Buried	One Day	One Week	One Month	Five Months	By-Products
Sack A							
Sack B							

Discuss which items changed the most or the least. Try to determine any by-products at the conclusion. Which could have favorable or unfavorable consequences? Here are some representative examples of time it can take for litter to decompose:

traffic ticket	**2-4 weeks**
cotton rag	**1-5 months**
rope	**3-14 months**
wool sock	**1 year**
bamboo pole	**1-3 years**
painted wooden sticks	**13 years**
aluminum	**200-500 years**
plastic 6-pack holder	**450 years**
glass bottles	**undetermined**

4. Have students research landfills and how they are constructed. Compare how they are similar to or different from the onion sack experiment.

Discussion:

1. Can nature deal with unnatural trash?

2. What we can't reduce, reuse or recycle still has to be discarded. What happens to it? What happens to it inside a landfill? Are there by-products?

3. What are the problems you can identify related to litter? What can you do to help solve or correct them?

See Trivia Cards **7**, 9, & 12.

My Favorite Things

3

Materials:

balance scale sheet (provided), paper brads, pencils, crayons

PURPOSE:

*To understand the difference between **renewable** and **nonrenewable** resources and to gain an awareness of our dependence upon both in our daily lives.*

Most of us are aware of some direct ties we have with the natural world--we use wood from trees for our houses; we know that pollutants can foul our air and water; we appreciate the aesthetics when we recreate in a park. On the other hand, it is difficult to develop an awareness and understanding of the thousands of indirect cause-and-effect relationships we have every day--how much petroleum was in the toothpaste you used this morning or the aspirin you took last night; how much coal was consumed to provide the energy to produce these products and their packaging?...and so on.

Many resources are renewable unless we use them faster than they can regenerate. Many nonrenewable resources can be used again or recycled in one way or another, but they are ultimately in limited supply.

By survey, most Americans now consider themselves "environmentalists" and realize that we are all dependent upon our natural resources for survival. However, most Americans live very comfortable lifestyles well beyond the survival level. This means that we as a nation support a small fraction of the world population but use vast amounts of world resources.

Conservation and good stewardship are more than just a series of right or wrong decisions; they are more often a matter of choices and priorities. The possibility of giving up a "favorite thing" to conserve a resource can personalize what may have otherwise seemed an easy decision for children.

Activity Ideas:

1. Have each participant prepare a list of their favorite things. Next, ask them to select the one thing from their list they would miss the most.

2. Pass out copies of the accompanying balance scale chart for them to complete using their selection.

Most children will usually list material objects, pets, sports or hobbies. These types of things will work fairly easily on the sheet. For instance, a physical object

like "my bicycle" uses a number of resources directly in their manufacture or use. Pets, sports, hobbies and the like are usually reliant upon resource based supports such as equipment, food, shelter, etc. The children's lists may sometimes include things of a more intangible or intrinsic nature such as "family," "pretty sunset," etc. These are often more difficult to translate to the worksheet for this activity. You may want to limit choices to favorite physical things for the chart.

3. When finished with the charts, cut out balance scale and stand. Assemble them with a paper brad and have students tip the scale to the direction and degree they think their list warrants.

4. Going back to their lists of favorite things, have students:

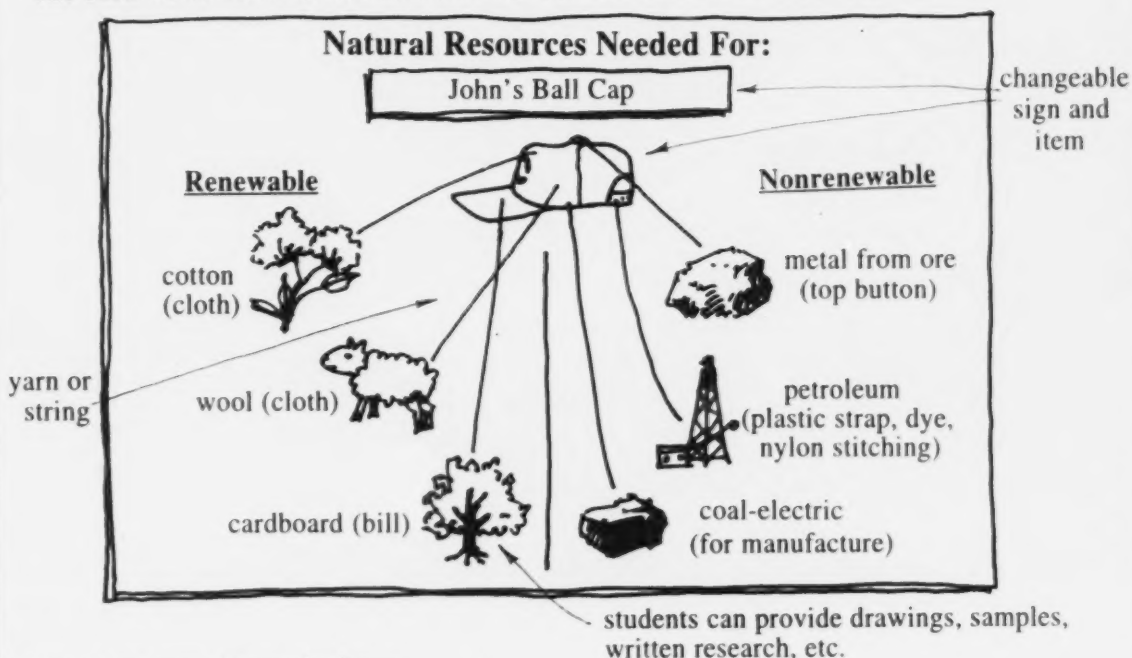
a. rank the five most important things on their list.

b. list natural resources used for/by each of these top five; also, list environ mental impacts for each.

c. reorder these five things to reflect environmental impact.

d. have students reorder their "top five" list for themselves in light of environmental awareness.

5. For a bulletin board, have students bring in some of their favorite items. Pick one each week and research which resources were used in its manufacture.



Each time you change the item:

- have students list materials it contains that can be recycled
- figure percentages or prepare graphs to illustrate ratios of renewable to nonrenewable resources used and recyclable to nonrecyclable contents
- have students write a paragraph telling why they believe this item has a mostly positive or negative effect on the environment.

6. Much of the litter we find in our parks is from packaging. Ask students to compare packaging from some of their "favorite things."

Begin by ranking packages in order of those which would be most apt to make them want to buy the product.

Next, list purposes for each package that you think the manufacturer had in mind (i.e., hold product together, freshness, cleanliness, make it look bigger, promote product, etc.).

Have students prioritize these lists in order of importance.

Discuss natural resources used to produce the packaging and reorder the lists in terms of environmental impact. Compare to the last list.

Make a final ranking of which packages are the most efficient but have the least environmental impact. How does this compare to their initial ranking of the packages?

As an art project, have students design a package for one of their "favorite things" that is both appealing and functional while still being environmentally efficient.

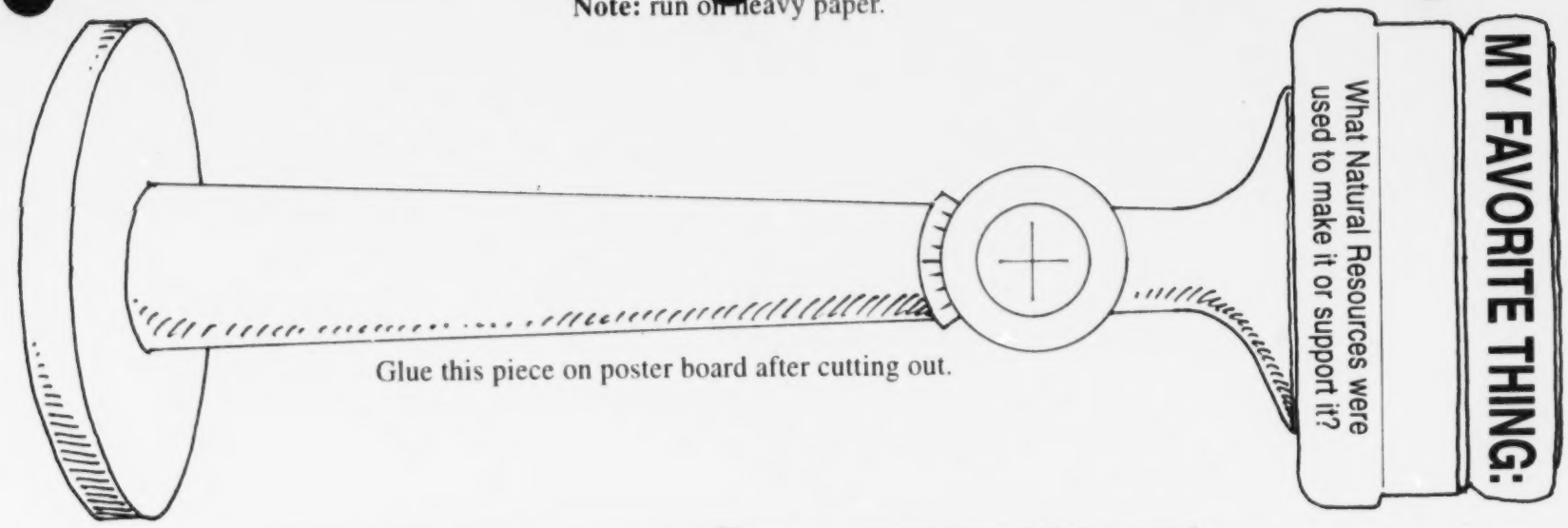
Discussion:

1. Have students discuss why manufacturers sometimes produce goods or packaging that is not environmentally efficient or safe. What can we do as consumers to change this?

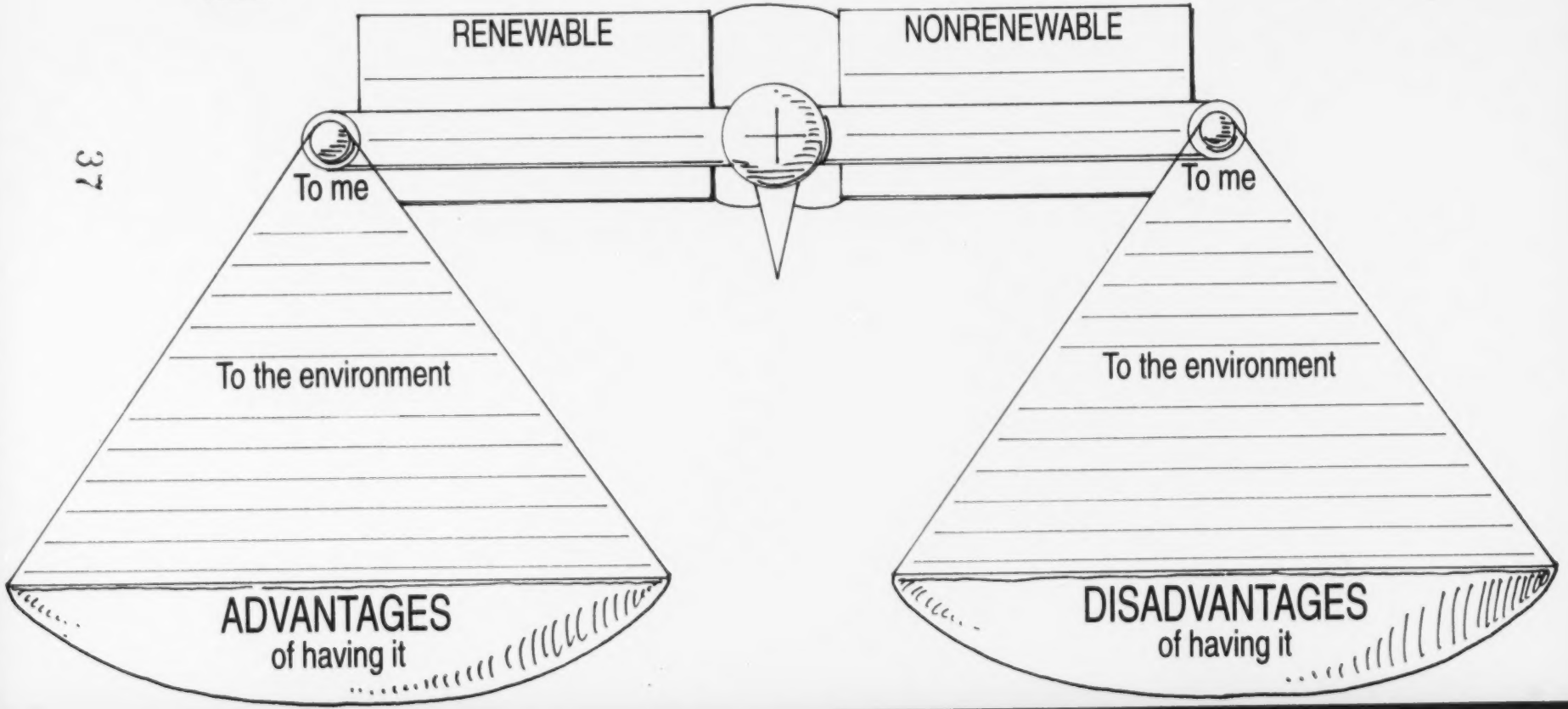
2. Discuss how other countries and cultures use their natural resources in comparison to us. How might they view some of our "favorite things?"

See Trivia Cards **7**, 10 & 13.

Note: run on heavy paper.



Glue this piece on poster board after cutting out.



Making Sense of It All

4

Materials:
blindfolds

PURPOSE:

To learn to use senses other than sight and to increase the powers of observation.

Man is a sight-oriented organism. This sense is so highly developed, and modern man is so far removed from nature, he tends to use this sense to the exclusion of all others.

We commonly see hikers in a park who consistently walk by some of the most interesting treasures nature has to offer. By using their senses and better powers of observation, they would not have passed them by.

Activity Ideas:

1. Select a natural item, one for each blindfolded member of the group who are seated in a circle. Number the items for identification. Give an item to each member and have them familiarize themselves with the item. Collect the items and pass them around the circle, having each person identify his by touch, and keep it as it comes to him.

2. Divide the group into pairs. Blindfold one member and have the other lead them around a designated area. Have the blindfolded member identify items by touch.

3. Have the group stand in a circle with a blindfolded person in the center. Have the members of the circle change positions, one at a time, by walking through the center of the circle. If the blindfolded "predator" in the center hears him and tags him, that person then is blindfolded and stands in the center.

4. Have the group sniff the air and list what aromas they notice. Have each member of group wet his nostrils and try again. Can they detect anything they cannot see? "Salt" the area with aromatic substances such as pine oil, moth balls or a sassafras root.

5. Put natural objects in bags so that the students cannot see them. Working in pairs, have the students take turns with one describing an object from feeling it inside the bag, while the other sketches it by the description.

6. As an outside activity, walk to various locations, and have the students give each location a descriptive name. At each location, have students make notes about their surroundings. Back in the classroom, each student writes a paragraph describing his chosen location and reads it. The rest of the class tries to guess which site it is.

Discussion:

1. Why do animals have wet noses? Have you ever seen an animal lick its nose? (Moisture helps trap scent molecules.)

2. Why do many animals have whiskers? (Hint: look up the word "tactile")

3. Think of other adaptations that increase or facilitate the various senses. How can we develop these?

See Trivia Card **4** & 8.

That's Your Opinion

5

Materials:
identification badges

PURPOSE:

To examine how people's perceptions are affected by their jobs or roles.

People's perceptions of the out-of-doors are as varied as people themselves. To a hunter, a deer is meat. To a wildlife biologist, a deer is research data. To a weekend hiker, a deer is a surprise! Natural resources differ also in how they can be managed. Some are ***renewable***; some are ***nonrenewable***.

Although we cannot completely satisfy every demand on a natural resource, we can often find the best use for that resource for the highest number of users through the ***multiple use concept***. Resource managers have to consider a number of factors to protect the environmental needs of an area while trying to satisfy needs of the people who use it.

Activity Ideas:

1. Before beginning "**That's Your Opinion**", prepare identification badges. Explain to participants before the hike that they will assume an identity different from their own along the trail. They are to react to various trail stops under their assumed identity.

2. Illustrate this point by holding up a stick. Ask participants what each of these people would say or do with a stick: a child, a frontiersman, a mother, a camper, a tree trimmer.

3. Shuffle the identification badges and ask each participant to select one and to keep their identity a secret. Hike along the trail until you reach an appropriate stop.

4. Ask each person to say something about the stop assuming they are the person identified on the badge.

5. Ask other participants to guess the identity of the person after they have made their comments.

6. After each stop, shuffle the identification badges and have participants redraw a tag before the next stop. Continue the comments and guessing.

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7. At the end of the hike, discuss perceptions and any conflicts in usage which may have arisen. As a conclusion to this activity, you may want to break students into mixed role groups to work on conflict resolution or multiple use planning.

Suggested Stops for "**That's Your Opinion**":

1. hollow tree
2. raspberry bushes
3. stream
4. littered area
5. barbed wire fence
6. soil bank
7. nut tree
8. large rocks
9. paved area
10. lake
11. dead animal
12. fallen tree

Sample Identification Badges:

1. Forester
2. Park Naturalist
3. Hunter
4. Scientist
5. Child
6. Frontiersman
7. Camper
8. Building contractor
9. Politician
10. Teacher

Discussion:

1. Which personality (role) was correct in their perceptions? How do people form perceptions?
2. Is it possible for everybody to be right? Wrong?
3. What are the consequences of using a particular resource?
4. What are the consequences of not using it?
5. Consider all angles (economic, environmental, social, aesthetic, etc.).

See Trivia Cards 1, 3, 8, 10, & 13.

Hide and Seek Animals 6

Materials:

magazine pictures, index cards, heavy paper, carpet tape, stapler

PURPOSE:

*To describe how animals use **protective coloration** to adapt to their **environments**.*

In nature, animals are both ***predator*** and ***prey***. Although a snake spends much time as a predator searching for his lunch, he may become prey as dinner for a hawk or heron.

By blending in with their surroundings, animals increase their chances for survival. Brown moths may use ***camouflage*** as they hug tree bark. Some animals in colder climates such as the snowshoe hare change from brown to white as winter approaches.

"Hide and Seek Animals" is an activity that demonstrates how effective ***protective coloration*** can be. It can be conducted as part of a regular hike or walk.

Activity Ideas:

1. Before the hike, place good pictures of animals along a short trail. Be sure that some animals are brightly colored as well as those that blend with the surroundings.

2. On the day of the hike, you may want to wear camouflage clothes to emphasize how people have picked up on this adaptation.

3. Discuss camouflage and how it can be an important adaptation. You can also discuss different forms of camouflage (i.e., colors, patterns, shapes, silhouettes, remaining motionless).

4. Have participants think of ways to camouflage themselves (i.e., using natural smells from fruits or leaves to mask their human odor; removing or covering shiny objects; striking a low pose to break your outline).

5. Try making camouflage crowns with strips of double-sided carpet tape. Stick one side of the tape to matching strips of heavy paper and staple to fit contour of head. Remove protective paper from carpet tape. Place twigs, leaves, vines onto tape to camouflage face.

6. Tell participants that several animals are playing hide-and-seek in the forest. They should write down on their index cards the animals they see along the trail during the hike. If they spot one of the animals, they should not give away its location.

7. At the end of the trail, compare notes. How many animals did they find?

8. This activity is good for a short one-way trail. You can pick up the animals together as you rewalk the return route. Sort the pictures according to which ones were seen most and least often.

Discussion:

1. Why were some animals seen by everyone? Why were some overlooked by everyone?

2. Which animals would most likely be dinner?

3. How do animals protect themselves if they don't use camouflage?

4. The way an animal is camouflaged depends on where it lives. How might an animal be camouflaged on a beach? In Alaska? Underwater?

5. Camouflage is only one form of protective coloration. Poisonous animals and plants are often brightly colored, and these bright colors can ward off a would-be predator. Many animals imitate other species with unique patterns such as "eye spots" (mimicry).

6. Are colors in plants important in any way?

See Trivia Card **2**.

Survival on a Shoestring

7

Materials:

shoestring, pencil, paper clips, paper, string, safety pin, rubber band, foil, plastic wrap, styrofoam cup

PURPOSE:

To counterbalance our "throwaway society" by considering alternative uses for items.

Frontiersmen and Indians knew the significance of the statement, "Waste not, want not." Game animals that were killed for food also became the source for other basic needs.

Animal skins became clothing and shelter. Animal bones were fashioned into needles and fishhooks. Antlers decorated dwellings, and even muscle tissues could be utilized as bowstrings.

Today, not only are we less industrious in our utilization of existing products, we tend to be a "throwaway society." If an item doesn't work, we throw it away instead of fixing it. If we get tired of items, instead of remodeling them to suit us, we throw them away and buy new. We often pay more for packages than their contents.

"Survival on a Shoestring" asks participants to go beyond traditional uses and brainstorm creative applications of everyday items.

Activity Ideas:

1. Give each participant a shoestring. Go around the circle and ask participants to suggest a use for the shoestring. Obvious uses for a shoestring are often shared first. So, ample time should be allowed for creative ideas.

2. Give each participant a "Survival Kit."

Sample Survival Kit (Put in a Ziplock Bag):

- shoestring
- paper clip
- string
- pencil
- safety pin
- foil
- plastic wrap
- styrofoam cup
- paper
- rubber band

Explain that you will assign each person (or pair) a base camp. In this base camp, they should assume that they must survive by using only their brains and the Survival Kit.

A tour should then be made of the base camps after giving each participant ample time to think of ways to utilize the items. Each participant should then demonstrate their ideas on utilizing the items in the kit.

3. For each item in the Survival Kits, have students list what our pioneer forefathers may have used instead. For example, the styrofoam cup may have been a gourd. Try to list the number of resources that were used to produce each modern item; then, do the same with the "pioneer" alternative list. (Remind students to include manufacture and processing of the items.) Compare lists.

Discussion:

1. Would you prefer to live as we do today or like a pioneer in Ohio in the 1700's?

2. What are advantages and disadvantages of each lifestyle?

3. Can you think of habits we can adopt from the pioneers that can help maintain a healthier environment?

See Trivia Cards 7 & 8.

Take Out the Trash

8

Materials:

trash sack containing: orange peels, aluminum cans, foil, plastic bags, newspaper, other kinds of trash; extra sacks

PURPOSE:

To redefine the word "trash" and compare the way people dispose of garbage to nature's way.

To most kids, garbage disposal means an appliance you switch on to get rid of dinner leftovers. Or, it means walking a sack of garbage to the garbage can. They don't think about processes such as ***decomposition.***

"Take Out the Trash" is a chance for children to understand how "trash" can be classified and how nature's trash is disposed of in the forest.

Solid waste is a problem that we are faced with in managing the parks which host millions of visitors each year. As kids develop a better understanding of this problem today, they can help better define solutions for tomorrow.

Activity Ideas:

1. Present a "typical" bag of trash filled with items that are commonly considered trash.

2. Individually remove each piece of trash from the bag and sort it into sacks marked: **RECYCLE**, **COMPOST**, **GARBAGE CAN**. Discuss the meaning of each labeled sack as the trash is sorted.

3. Encourage the group to go beyond typical answers and do some creative brainstorming for recycled uses of products such as Big Mac cartons, styrofoam cups, etc.

4. It is hoped that the sack marked, **GARBAGE CAN**, will end up with the least items.

5. Now, go on a hike to view how nature disposes of its "trash." Categorize the disposed items in nature in the same way as the human discards: **RECYCLE**, **COMPOST**, **GARBAGE CAN**.

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6. Examples of nature's disposal system could include:

RECYCLED

- brush piles are shelter to animals
- hollow trees become dens for raccoons, opossums
- hollow trees are homes for woodpeckers
- fruit that drops to the ground is eaten by animals

COMPOST

- leaves are composted
- organic plants and trees are composted

GARBAGE MEN (beetles, flies, vultures, fungus)

- animal carcasses
- animal scat
- decomposing organic matter

Discussion:

1. Consider how nature disposes of human litter. Can nature deal with unnatural trash?

2. What happens to the human trash that was in the "garbage can" category?

See Trivia Cards 1, **7**, 12 & 13.

What's the Difference? 9

Materials:
stories, pencil, paper

PURPOSE:

To develop an awareness of our role as environmental stewards and to show how small actions can lead to big consequences.

When hiking in a state park that covers hundreds of acres, it is difficult for children to believe that what they do in the park that day could make an impact on its resources for years.

"What's the Difference" encourages respect for the natural system and its fragility with the idea that we are part of that system.

Activity Ideas:

1. "**It Does Make a Difference**" can be used in conjunction with a hike or classroom activity.

"IT DOES MAKE A DIFFERENCE"

There was once a boy named Ned who never worried about things. Like, if he forgot to walk his dog, he'd say, "Oh, what's the difference?"

If he rode his bike then left it lying in the street, he'd say, "What's the difference?" When he got up in the morning, he never did his chores willingly. "What's the difference?" he'd say.

Ned's parents tried to convince him that there was a reason to do his chores and be responsible. They explained how his dog needed exercise in order to be stronger. They described how his bike could get hit by a car or be stolen if he left it lying around. They told him how nice his room would look if he made his bed.

But, these things didn't matter to Ned. He really believed that what he did or didn't do never mattered.

One day, Ned and his parents went camping. They found a beautiful site along a peaceful stream. Ned and his parents fished in the stream. When Ned's line got tangled, he cut it off and threw the fishing line in the water. When his dad made him fish the line out, Ned said, "What's the difference, it's just a little bit of string."

After dinner, Ned's mom told Ned to carefully put out their campfire. "What's the difference, mom?" said Ned, "It's going to burn itself out anyway."

Later, Ned, his mom and dad treated themselves to popcorn and soft drinks to finish the day. Ned took the pop cans out of their plastic holder and, instead of throwing the plastic in the trash can, Ned tossed it in the stream. "Ah, what's the difference," thought Ned. "Everyone else does that."

The next morning, as Ned and his family were folding up their camp things, they noticed a large crowd had gathered near the stream. Curious, they went over.

There, beside the stream was a mallard duck with its head trapped in one of the openings of the plastic can holder. Five baby ducklings were excitedly trying to hide in the safety of some cattails on the far side of the stream. Apparently, the duck had been feeding in the stream and had gotten its head stuck in the plastic as it dabbled for food.

Ned couldn't believe his eyes. As the ranger picked up the duck to free it from the plastic, he turned to a boy Ned's age and said, "Thanks son, you really made a difference for this duck. If you hadn't rescued her, she would surely have died."

The ranger continued, "You know, something like a piece of litter or one thoughtless act doesn't seem like much, but it can really make a difference."

Ned thought, "I did make a difference. But, it sure wasn't the kind of difference I wanted to make."

2. On a hike, the group can follow up by viewing other examples left by people who though, "Oh, what's the difference" when they did something.

As each item is surveyed, the group can discuss: How did this happen? Why? What effect do you think this action will have on the forest? Can it be corrected?

Sample items to be surveyed:

Beech tree with initials
Peeled bark from trees
Defaced rocks
Trail compaction in areas besides designated trails
Picked flowers
Animal homes destroyed in rotten logs
Hollow trees cut down
Littered pond
Trash in the forest

3. Have students make up a title and write their own endings for the following story. Some questions to discuss before/after doing this: Do you think Jodi was doing anything wrong? Why? Do you think she knew? Were Karen, Jason or you doing anything wrong? How might Jodi's behavior reflect upon you and the group? Could you do anything to change this?

(title)

My two friends, Jason and Karen, and I really enjoy the outdoors. So, we decided to start a nature study club.

Our first outing was a hike through the woods behind the school. We saw five or six kinds of wildflowers and a cardinal in its bright red suit. As we sat eating lunch by the creek bank, we watched a chipmunk as it gathered some pieces of bread we left on an old stump. Jason even got his picture. It was great!

The next day, while we were talking about how much fun we had, Jodi Cole overheard and asked to join us on our next hike.

"Sure, we're going out to Strap Run this Wednesday after school," said Karen. "Come on along with us."

When we arrived at Strap Run on Wednesday, it was a beautiful day of blue skies and warm breezes. Jodi was still drinking from a can of pop which she held in one hand as we started down the trail. Before we had reached the first bend in the path, I heard a hollow "clunk" sound as something metal bounced through some exposed rocks. I turned to see that Jodi's hands were now empty.

Along the way, we discovered many wonderful things including a box turtle and a woodpecker feeding its young. We decided to stop and have the sandwiches Karen had prepared for lunch at around noon. There was a shaded spot at the foot of a tall rock overhang where we sat.

Jodi had picked up an old rusty nail she had found beside a trail sign. She began scraping a groove into the rock ledge above us. "What are you doing", asked Jason. I'm carving my name so that everyone will know we have been here," answered Jodi. "You can carve your names, too!"

Discussion:

1. Look up the word "steward" in the dictionary. How are we all stewards of a state park?

2. What actions or habits make us good stewards? Bad? How can we know the difference?

See Trivia Cards 7, 10 &13.

Land Lasso

10

Materials:

yarn, string, rope, hand lenses, check list, measuring tape

PURPOSE:

To find a variety of organisms in a limited area, and to show that nature's interdependencies exist on every level.

During a half-mile hike in the forest, one would expect to see a variety of natural features: animal homes, insects, plants. But, suppose the "hike" became an area inside a circle of rope and the "hiking" was done on hands and knees? Would the same ***biodiversity*** of organisms exist in such a limited area?

Scientists often use sampling plots called ***quadrats*** to study the characteristics of an area. This can include important information such as plant and animal populations, environmental quality or ***carrying capacity*** of a site.

With this activity, participants will be using sampling plots and may draw some interesting conclusions. Although "Land Lasso" uses a loop of rope, there are a number of other devices participants can use for defining sampling plots. For instance, a hula hoop is approximately one square yard, and a coat hanger bent into a square or circle is about one square foot.

This activity is good for including applied math exercises to compute percentages, area measure, population estimates, or to translate to word problems.

Activity Ideas:

1. Hand out pieces of rope (or yarn or string) about 4 1/2 feet in length. Working in pairs,participants should tie their rope into a loop.

Toss these "lassos" at random into the area being investigated. The lasso should be spread to form a circle. This will define a quadrat of about one square foot.

Give each team of investigators a copy of the accompanying checkoff sheet of things to find within their lasso.

2. Next, define the borders of the overall study site, and let students measure and compute its square footage. Then, pick an animal or plant that is evident on the site

(i.e., ants, clover, dandelions), and have students see how many of these they can find in their individual study plots. Have them compute an average number per plot (total number from all plots divided by the number of plots). Then, compute an overall population estimate by multiplying the plot average by the square footage of the study site. (Remember, each lasso contains about one square foot.) For example: Study site is 40 feet long x 60 feet wide = 2,400 square feet.

Sample plot (1 sq. ft.): #1 has **6** ants
#2 has **11** ants
#3 has **10** ants

27 total ants in all plots

2,400
x 9 (avg. ants per plot)

21,600 estimated total ants on site!

3. Graph the results of the plots.

4. Repeat "Land Lasso" in a different habitat: beside a stream, at the edge of the woods, or near a parking lot or sidewalk. Compare the results. Are they different from the original study? Discuss reasons for differences.

Discussion:

1. What would happen in the example given on ants if one lasso landed on an ant hill?

2. How could scientists use information from this kind of a study?

3. Nature can be complex and diverse even on the smallest scale. Ask students to identify interdependent relationships existing just within their lasso. Can they define a complete ecosystem there also. Don't forget to include non-living elements such as soil, air, etc.

See Trivia Cards 1, 2, 4, 5, 6, 8, **9** & 11.

Land Lasso Checkoff List

Can you find...

- ☐ an animal home?
- ☐ animal food?
- ☐ a new plant?
- ☐ an old plant?
- ☐ an insect?
- ☐ something unexpected?
- ☐ a seed?
- ☐ a predator?
- ☐ something hidden?
- ☐ something out of place?
- ☐ something nonliving?
- ☐ an animal sign?

What is the most common plant _____ /animal _____ ?

How many of these would you estimate in your quadrat? Plant _____

Animal _____

Can you calculate an estimate of how many of each in a 10 square foot area? (Remember, your quadrat is one square foot).

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Eating Like a Bird

11

Materials:

fork, soda straws, nutcracker, chopsticks, small kitchen strainer, tweezers, paper bag, "gummy" candies, red pop, walnuts (or any nuts in shell), uncooked rice, apple slices, marshmallows, dry cornmeal or oats, cup, plate, bowl, piece of styrofoam

PURPOSE:

*To study **adaptations** through the unique differences in bird beaks.*

Birds, like all organisms, are well-suited to survival in specific ***habitats***. This activity gives participants a chance to discover how bird beaks are unique ***adaptations*** which can help each species fit a certain ***niche*** in the ***environment***.

Activity Ideas:

1. Introduce bird eating habits by discussing with the group last night's dinner. Ask them if they could have eaten their entire dinner with a knife? A fork? A spoon? Each utensil is suited for a special kind of food.

2. The same is true of birds. Blue jays rely on their nutcracker beaks to break open hard shelled food. Kingfishers spear their fish dinners with their pointed beaks. Dabbling ducks use a slotted spoon beak to sort edible food collected during their underwater probes.

3. Provide participants with utensils listed above. (If it is impossible to gather enough utensils for each participant to have his own set, group the participants or have one set and let participants take turns experimenting.)

4. Explain that you will give each participant food that is representative of a particular kind of bird food. They must look at their utensils and decide which is best suited for eating that type of food. They are then permitted to test each utensil to determine the most effective one. (See"How to Eat Like a Bird" on next page.)

5. After each type of bird food is sampled, discuss why they selected the utensil they did.

6. Once participants have had the opportunity to "eat like birds," fill in the accompanying bird beak picture sheet by matching each of the 7 utensils to the most appropriate bird. You can do this individually or as a group as you discuss each adaptation.

7. Which bird on the sheet has a beak most like a cardinal's? What type of food would you include in a feeder to attract cardinals (our state bird) to your own backyard?

How To Eat Like A Bird:

Give participants the following items as sample bird food:

- **cup of red pop** (flower nectar) = **hummingbird** (straw beak)
- **walnuts** (seeds and nuts) = **grosbeak or cardinal** (nutcracker beak)
- **cereal,** such as puffed rice, in a cup of water (aquatic plants and animals) = **duck or flamingo** (strainer beak)
- **"gummy" candies in a bowl of cornmeal or dry oats** (worms in mud) = **woodcock or snipe** (lond chopsticks beak)
- **apple slices on plate of shallow water** (fish in water) = **kingfisher or heron** (fork beak)
- **marshmallows tossed into the air** (flying insects) = **whip-poor-will or nightjar** (paperbag beak)
- **rice pushed into styrofoam** (grubs /insects in a log) = **warbler or woodpecker** (tweezer beak)

Discussion:

1. Discuss the concept of adaptation. Think of adaptations in the animal world other than bird beaks.

2. List groupings of animals that have similar adaptations—for instance: butterflies, moths and hummingbirds have mouths like a straw for sipping nectar; muskrats, frogs and ducks have webbed feet for swimming. Do the animals in each grouping require similar habitats or have other similarities?

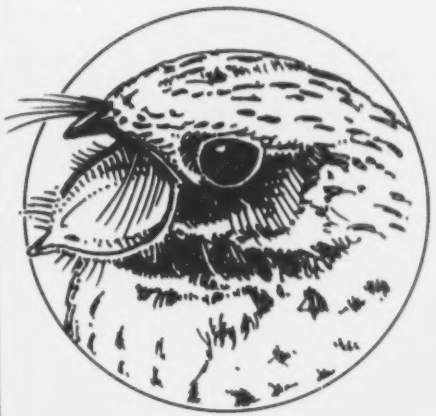
3. Do animals with similar adaptations require similar habitats or living conditions (e.g., all live in a wetland, all are nocturnal, all live in cold climates).

4. Can diversity of habitat mean diversity of animals (biodiversity)?

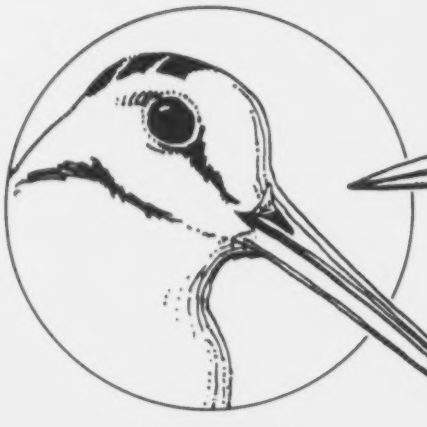
5. Think of ways to provide feeding areas for the bird types in this activity considering their feeding habits.

See Trivia Cards 1, 2, 4, 5, 6, 8, 9, 11 & **12**.

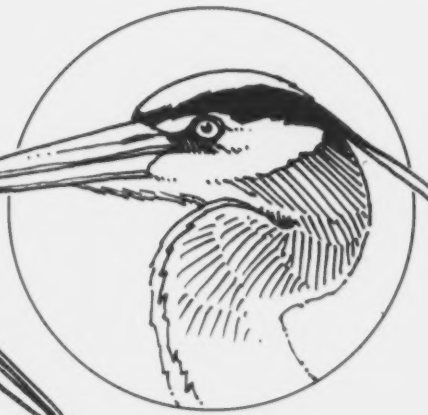
Eating Like a Bird



Whip-poor-will

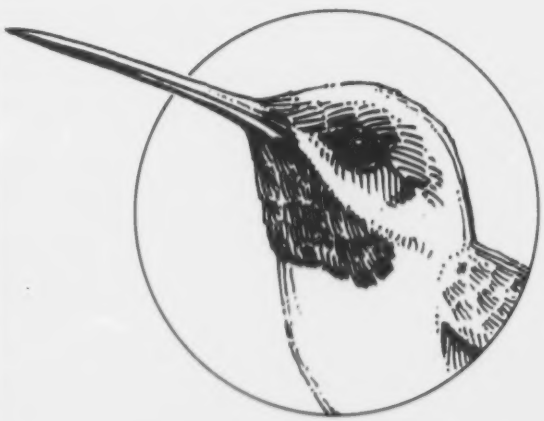


Woodcock

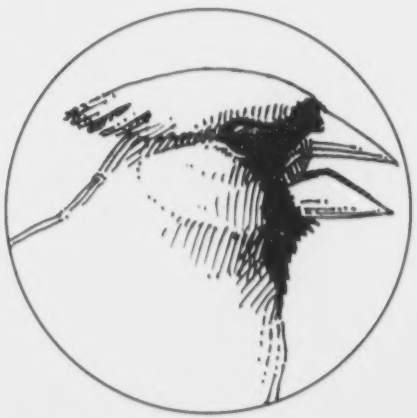


Heron

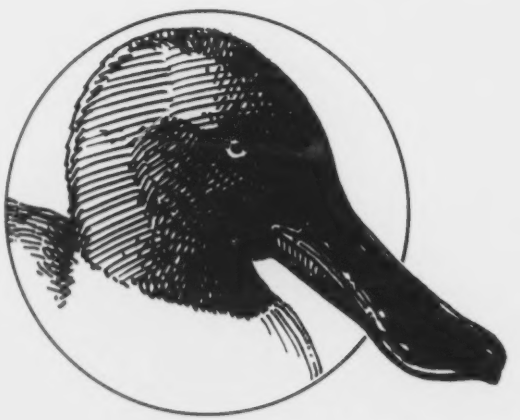
Woodpecker



Hummingbird



Cardinal



Duck

Snake Holes and Other Sayings 12

Materials:

pretest, pencils, slides or other visuals of natural objects

PURPOSE:

To explore how our cultural history has influenced our perceptions of natural history and to clarify the realities of folklore and some common myths.

On almost every nature hike, children point out "snake holes." According to kids, snake holes are small holes along the trail that are dug by snakes. Although it is true that snakes may inhabit holes, no snake is equipped with a digging tool on its snout. The holes we see are usually made by crawfish or small animals.

Folklore and legends are difficult to dispute. They have been handed down from generation to generation. Some lore, such as peculiar animal behavior before storms, is fairly accurate.

Many children (and adults) carry folklore fallacies with them through their lives. This misinformation can obscure how they understand and perceive the natural world. On the other hand, folk legends can give children an awareness of heritage, a sense of culture and an understanding of the close ties between man and nature.

Activity Ideas:

1. Introduce the topic of folklore by discussing sayings that participants may have heard from their families: "Carrots help you see at night." "Eat the crust on your bread to make your hair curly." Then, let participants fill out the pretest (included at the end of this activity.) As a follow-up, score the pretest. You can use slides or other visuals to illustrate the accompanying script that will explain the answers as you score.

2. Have students research a natural topic to find one fact they did not know. Have them write this on a sheet of paper. Using their imagination, ask them to make up a story or "folk legend" that might arise from this fact. Have them write this on the opposite side of their paper. Take turns reading these and let the rest of the class try to decide which is the fact and which is fiction.

3. You may want to try this variation of the old telephone game. Divide students into groups, each group representing a "generation." Give each group a card with a nature fact written on it such as:

Fact — A beaver does <u>not</u> carry mud on his tail but uses his front legs to carry it against his chest.

Fact — Goldenrod has a sticky pollen carried by insects, not by the wind like ragweed. Goldenrod is <u>not</u> the pollen that makes you sneeze.

Fact — A bluebird is <u>not</u> really blue but looks blue because of the way its feathers reflect light. A cardinal <u>is</u> really red because its feathers contain true color.

The first person in the group reads the card. Each person after that whispers the message to the next. The final person in the group to hear the message writes down what he hears. Then, the rewritten cards are passed on to the next group (generation) to repeat the process until there is a complete rotation. Compare the final written message to the original fact cards.

4. You may want to incorporate an extended project such as this. Ask students to interview grandparents, aunts, uncles, older friends, etc. at home to gather folk legends. Or, consider doing this by pairing students with "buddies" from a local senior center or having a panel discussion at school. Follow-up activities might include a scrapbook or student produced booklet of home remedies, recipes, etc.

Discussion:

1. How do these sayings and legends get started, and how are they passed from generation to generation?

2. Are they true? Why do we say them if they are not?

3. Are they false?

4. How does our culture, society, family or friends influence the way we think about nature?

See Trivia Cards 1, 2, 3, 4, 5, 6, **8**, 9, 11, 12 & 13.

Snake Holes and Other Sayings

Pretest

Mark "true" or "false" for the following statements.

1. Owls are very wise.
2. If you "eat like a bird", you don't eat very much.
3. Bats are blind.
4. If an opossum is scared, he'll play 'possum and pretend he is dead.
5. Raccoons are clean animals and always wash their food before they eat.
6. On February 2, groundhogs leave their dens and predict spring.
7. Toads cause warts.
8. Milk snakes milk cows.
9. Bears hibernate through the winter.
10. If you are lost in the woods, you can find the directions because moss always grows on the north side of trees.

Snake Holes and Other Sayings

Answers for Pretest

— Owls

The "wise" owl has a flat face and large, forward-facing "humanlike" eyes. Do the large eyes denote intelligence? No, they are large to gather more light for the night hunting owl. Owls actually have small brains for their size. Owls depend on their keen eyesight and sense of hearing to prey on mice and other small rodents.

— Birds Feeding

Birds actually eat enormous quantities of food. Because they have a high metabolic rate, they are efficient in food digestion. In fact, a bird uses 33% of its food intake as compared to mammals who utilize 10%. Birds must eat large amounts to maintain their high body temperature. A robin will eat 14 worms per day while other songbirds often eat their own body weight in food each day.

— Bats

Bats appear to be blind because of their erratic flight. But, their erratic flight is because they are actually chasing their food using echolocation. Echolocation is a radar system that bounces high frequency sound waves off their prey--usually moths and other insects. It also locates obstacles like a big tree or a person. Although bats hear better than they see, their small eyes function very well.

— Opossum

An opossum doesn't "play" anything when danger approaches. When it is provoked, the opossum appears to lie down and pretend it's dead so that its predator will seek more challenging prey. Actually, the opossum has such a primitive brain that it enters a coma when it is frightened. When attacked, its brain shuts down and the opossum suffers temporary paralysis. A short time later, the opossum recovers and continues on its way.

— Raccoons

Raccoons are often found foraging for food along stream banks and ponds. Raccoons have a variety of food preferences which include small crustaceans that are found in aquatic habitats. The notion that raccoons "wash" their food might have come from their foraging habits. They are actually sifting through bottom debris searching for food. Another source for this saying is that raccoons have small throats, and it is believed that wetting the food might help soften it and make it

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easier to swallow. But, raccoons have been observed in the woods away from water contentedly feasting on unwashed and unsoaked food.

— Groundhog

Groundhogs or woodchucks are one of the few mammals which are true hibernators. In the late autumn just after the last of the green plants have been killed by frost, groundhogs enter their burrows for long winter naps. Inside their protective dens, groundhogs undergo a rapid decrease in metabolic functions. Their respiration drops and their heart rate becomes significantly reduced. Animals that hibernate remain in this form until daylight hours increase and temperatures warm. If February 2 or any other late winter day is an unusually warm day, the groundhog may emerge from its den, but it is not likely.

— Toads

Although the warty appearance of toad skin has made people think toads can infect their skin, toads do not cause warts. Toads do have parotoid glands located on the sides of their heads. These glands are filled with a toxic fluid that can produce a strong reaction in some people. Animals who bite toads will often get sick. Because children may rub their eyes or put their hands in their mouth after handling a toad, they should wash their hands immediately.

— Milk Snake

When farmers found their cows were not producing milk as they had expected, they searched for a cause. Since milk snakes inhabit barns to feed on the mice that live there, they are also found near cows. Farmers deduced that the milk snakes must be attaching themselves to the cows' udders and milking them before the farmer could get to the morning milking. Milk snakes do not milk cows. By killing these snakes, the farmers did themselves more harm than good. They eliminated the animals that were keeping their barns free of destructive mice.

— Bears

Bears do not actually hibernate although it is true that they sleep away much of the winter. Like many other animals, bears enter a period of inactivity during the colder months, and they will emerge from their dens on warm, winter days to feed. Bears live primarily off their body fat in the winter but do not experience the severe drop in metabolic functions that true hibernators do.

— Moss

Although every survival manual ever written seems to include a section on determining direction by moss on the tree, it is not accurate to pinpoint north by moss growth. Moss does prefer growing conditions of shade and moisture, which is often northward facing. But close examination of trees will indicate that many trees have moss encircling their trunks.

A Slick Resource

Thanks to the Ohio Department of Natural Resources, Division of Oil and Gas, for developing the following activities and information.

13

Materials:

suggested with each activity

PURPOSE:

*To increase the student's awareness and understanding of **nonrenewable** resources and to familiarize students with the profusion of petroleum products that affect our daily lives.*

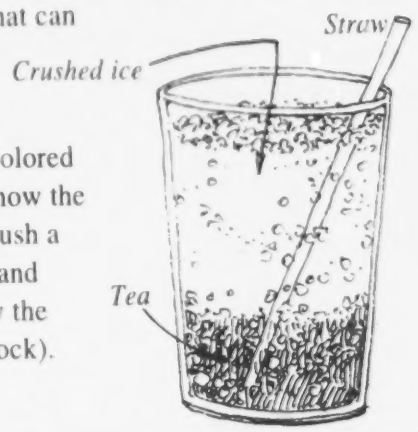
Riddle: This natural resource found in Ohio is not found everywhere else in the world. It can be found more than a mile underground as a liquid or a gas and may have a strong odor. This resource is made up of hydrogen and carbon molecules. You use this resource every day, and one gallon of it costs less than one gallon of milk. It is used to make over 3,000 different things. Its future supply is limited. What resource is this?

Answer: *You may know this resource by several names: oil, crude oil or petroleum. If your knowledge about oil is **crude**, and you want to know more about one of Ohio's natural energy resources, then here is some help in **digging** up the facts about crude oil.*

Oil is a ***nonrenewable*** resource that we are very dependent upon in our daily routine. The following can help increase students' awareness of how closely we are tied to the natural world for our basic needs.

Activity Ideas:

1. Here are some ways to simulate an oil reservoir. Have the students consider what common objects can be used to show how a liquid can be trapped in a solid then easily removed. Remember, oil reservoirs are made of rock that can be near the ground surface or miles beneath it.



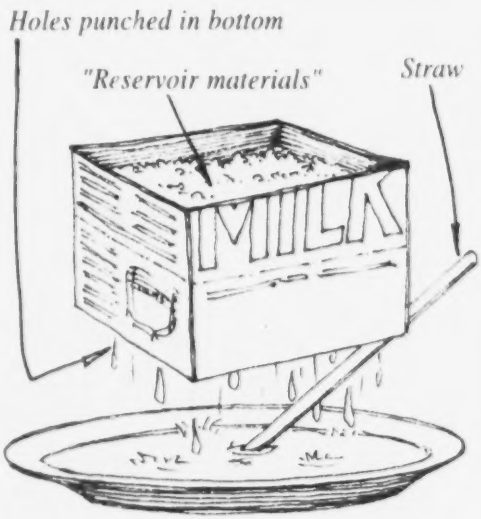
Procedure:

a. Put crushed ice in a glass jar with tea or other colored liquid added to fill the spaces between the ice (to show the ***porosity*** requirement for a reservoir rock). Then, push a straw into the ice just below the level of the liquid and slowly suck the liquid from around the ice (to show the ***permeability*** or ability of fluids to move within a rock).

b. You can substitute clean pea gravel, marbles or a sponge for the crushed ice. Note, if you use a sponge, cut a groove in the sponge for the straw to slide into before you put it in the jar.

c. Some oil-bearing rock can be mined (oil shales) with the broken bits of rock heated to remove the oil. This can be shown by placing some coarse sand in a cardboard milk carton. Melt some paraffin (to act as oil) and pour just enough paraffin over the sand to make the sand moist. When the paraffin cools and hardens, remove the milk carton from the solid block of sand (the reservoir rock). Now break the sand block apart and put all the pieces in a heat-proof container over a low heat source. The paraffin will melt away from the sand, separating the "oil" from the "reservoir rock."

d. Oil can also be mined without removing the reservoir rock by letting gravity do the work. Large shafts are dug below the level of the reservoir rock. Then, tunnels are constructed just below the reservoir; holes are drilled up into the reservoir, allowing the oil to slowly drip down the hole, and collect in the tunnel. It is then pumped to the surface. This can be shown by using a milk carton containing a reservoir material (coarse sand or a sponge). Punch a few small holes in the bottom of the milk carton, add the reservoir material, and then add a liquid (to act as the oil). Hold the carton over a dish as the liquid slowly drips out of the carton and is collected in the dish to be lifted (or sucked up) through a small tube.



2. As a class or in small groups, create a list of items that have oil in them (petrochemical products). After the list of objects that contain petrochemicals is finished, create lists of objects that do not contain petrochemicals.

Compare the petrochemical list to the non-petrochemical list. Which list is longer? Which list was longer when your grandparents were your age? Are the objects on one list more "important" than those on the other list?

3. From magazines and newspapers, create a collage that displays your concept of oil. The words or pictures can portray favorite oil products and the impact of oil on you, the environment or the economy.

4. Write a poem or short story about the path oil can take. Can you imagine the endless cycle of lubricating oil being used, then cleaned, then used again, then cleaned,

etc.? What would happen if that lubricating oil were not recycled? What would it do? Where would it go?

5. Have the students research to determine the major oil-producing countries and the major oil-consuming countries. Using a copying machine that reduces and enlarges, "redraw" the world by showing the major oil-producing countries not by their geographic size but by their oil production compared to other countries. Then "redraw" the world using oil consumption as the basis for size. Compare the two maps.

How does the U.S. compare with these different views of the world? How do the Middle East countries compare? How does Japan compare? Could these different "views" of the world affect how governments/countries do business with each other?

6. Use the accompanying fact sheet to write word problems that utilize math skills and help to discover more facts about oil.

Discussion:

1. What is the total cost (i.e., environmental and economic impacts) of having the convenience of products made from oil? Are there alternatives to these oil products? Would the alternatives be more or less desirable? Why?

2. If the U.S. suddenly stopped importing oil, what effect would this have on the country as a whole?

3. What can you do to reduce the volume of oil that you use or is used on your behalf (about 840 gallons per year)?

See Trivia Card 7.

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Some Slick Information

WHAT IS IT?

• Petroleum is a Latin word meaning "oil from rocks."

• Petroleum is a ***fossil fuel***. It is made from the remains of small plants and animals that lived in shallow oceans millions of years ago.

• It takes millions of years of heat and pressure, created by thousands of feet of ocean sediments, to change plant and animal remains into the hydro-carbon compound, ***petroleum***. Because it takes millions of years to form, petroleum is a ***nonrenewable*** resource. The petroleum we use cannot be replaced in our lifetime or in future generations.

• ***Sedimentary rock*** (sandstone or limestone) that holds the petroleum like a sponge is called a ***reservoir***.

• Most of Ohio's crude oil has paraffin (wax) in it. Ohio's paraffin-based oil is the source of high-grade ***lubricants***. Asphalt-based crude oil is produced in the Gulf Coast area and is the major source for motor ***fuels***.

• Natural, crude-oil "seeps" (areas where oil oozes to the surface) have been used since ancient times to provide fuel for lamps and as medicine.

• There are more than 3,000 products made from petroleum.

• To ***refine*** crude oil into finished products, a complicated process of heating (distillation), cracking molecules (conversion) and treatment are used.

• About 50% of the oil refined in the United States becomes motor fuel; 20%becomes home fuel oil; 10% jet fuel; 7% is used for fuel oil to generate electricity and as an industrial fuel; 4% becomes liquified gases; 3% is used to produce ***petrochemicals*** (see the list of petrochemical products); and 1% goes into lubricants.

• Ohio's ***paraffin***-based crude oil is refined into 33% lubricants, 33% motor fuel and 33% fuel oils and jet fuel.

• Brine is a saltwater by-product of oil and gas production. About 8.5 million barrels of brine along with 9 million barrels of crude oil are produced each year in Ohio.

WHERE IS IT?

• Oil is produced from 68 of Ohio's 88 counties.

• Oil is found in Ohio's Paleozoic Era rock formations that range from the Pennsylvanian Period (about 285 million years ago) to the Cambrian Period (about 500 million years ago).

• The first oil from a drilled well was discovered in Noble County, Ohio in 1814 when drillers were looking for saltwater to be used to preserve foods.

• The first well to find oil was drilled in 1859 in Titusville, Pennsylvania.

• The Ohio Division of Oil and Gas was created in 1965 because of the Morrow County oil discoveries—the last unregulated "oil boom" in the United States.

• Thirty-one states have known deposits of petroleum or ***reserves***. Texas, Alaska, California, Wyoming and Oklahoma have the largest reserves.

• The U.S. imports 42% of the oil it uses. More than half of this oil is imported from the Organization of Petroleum Exporting Countries (OPEC); Canada, Mexico, the Virgin Islands/Puerto Rico, and the United Kingdom supply the rest.

HOW MUCH?

• Crude oil is measured in barrels—one barrel equals 42 gallons.

• Each Ohioan uses about 20 barrels of oil each year.

• Ohio produces about 9 million barrels of crude oil each year.

• Between 1980 and 1990, more than 36,000 wells were drilled in Ohio looking for oil and natural gas.

• By 1990, Ohio had more than 65,000 producing wells.

• More than 85% of the wells drilled in Ohio produced oil and/or natural gas; the rest are known as "dry holes" that are filled with cement to prevent environmental problems.

• In 1896, Ohio was the leader in oil production. Today, Ohio remains as one of the top 20 oil producing states.

• In 1990, the United States produced 9,860,000 barrels of oil per day with Texas, Alaska, California, Louisiana and Oklahoma as the top producers.

• The United States uses 17 million barrels of oil per day—more than any other country in the world. Japan is the second largest consumer of oil—using one-third as much as the U.S.

Information Source:

Ohio Department of Natural Resources
Division of Oil and Gas
4383 Fountain Square Court, B-3
Columbus, Ohio 43224-1362
(614) 265-6916

Activity Extenders

Introductory Page

Sponge Activities

Games

Trivia Cards

"... in the country there is never a dull moment, but a whole universe filled with light and air and water and living things."

—*Louis Bromfield*

"Like a great poet, Nature produces the greatest effects with the fewest materials..."

Activity Extenders

The purpose of this section is to offer ideas and information which can help round out and embellish the Portapark activities. It is divided into the following sub-sections:

• Sponge Activities

What to do when you have 15 minutes left; you don't have enough time to conduct a lengthy activity; or you would like to throw in a quick exercise to help release energy and reinforce a previous lesson?

• Games

These activities tend to be more recreational but can help teach environmental principles. Many can be used to help reinforce the core activities and are presented in a similar format. Some are designed as indoor activities; some as outdoor games. There are sheets which can be copied for students to use as desk work or on the bus. A couple of these games can help familiarize students with a state park if you visit us on a field trip.

• Trivia Cards

At the back of this section, you will find some sheets of heavier paper stock. These are perforated and can be separated into a set of trivia cards which you can carry with you. Cards applicable to an activity are listed by number at the end of that activity. In addition to augmenting specific activities, they can be used alone. The general topical areas are identified in the upper right-hand corner with a more specific title to the left.

Sponge Activities

1. Create a symphony by imitating nature sounds--bullfrog bass section, songbird flutes and so forth.
2. Pick an ant or other insect and follow it for five minutes. Trace its path as you follow with a piece of chalk. Lay a string on the chalk line and measure it.
3. Divide class into two groups. Alternate sides, with the firstnaming a predator; second has to name the prey.
4. Discuss how seeds travel, and see how long you can keep milkweed seeds airborne without touching them.
5. Have students pretend to wash their hands, brush their teeth, etc. Each time hold a large bucket under a running faucet and measure the amounts of water used. How can you change the amount?
6. Read ingredient labels on packaged food items in your lunch. What is the source of each ingredient--plant, animal, mineral, etc?
7. With color sample chips or cards from a hardware store, match to colors of natural objects. Discuss camouflage and protective coloration. What are advantages of colors that blend or of those that standout?
8. Cut pictures of natural objects in two and let students have one half. Challenge them to draw the missing half. Then, give them the second half to compare.
9. Pour a pitcher of water from a turbid stream or pond through a coffee filter. Discuss what you found and from where it may have come.
10. Read an appropriate story in an outdoor setting.
11. Lay out a yarn trail on the ground in a grassy area. Students travel the route on hands and knees to look for the small, often-missed side of nature.
12. Line up by naming Ohio animals in ABC order, naming a tree, naming something you could find in a wetland, etc.
13. Play nature charades.
14. Spread students out and sit while remaining quiet for one minute. See who can list the most sounds they hear, animals they see, etc. during that time.

15. Run a sorting relay with a stack of cards or items in a pile on one end and labeled baskets at the other end. Here are topic ideas:

—natural resources	sorted to	renewable/nonrenewable
—animals	sorted to	predator/prey
—litter	sorted to	recycling categories
—commercial goods	sorted to	origin (plant/animal/mineral)
—animals/plants	sorted to	classification or habitat type

16. Take turns picking from a deck of shuffled topic cards. Each time a card is drawn the player has 30 seconds to tell all he/she can about the topic selected.

17. Look for superlatives in the natural setting around you (i.e. the biggest tree, the smallest bug, the tallest flower, etc.).

18. Measure a tree's diameter and guess how old it is (see "diameter tape" in Home made Gadgets list in the Presentation Ideas Section). Think of historical events which took place during the tree's life.

19. Have a silent "Nature Watch" by spreading students out at roughly ten foot intervals along a trail. Have them sit quietly with pencil and paper to record what they see, hear or smell for about five or ten minutes.

Animal Olympics

Materials:
printed program of events

PURPOSE:

To compare animal abilities to children's abilities.

Although the official olympics occur only once every four years, you can organize your own animal olympics at any time.

1. As in the traditional olympics, participants in the animal olympics will compete in tests of skill and endurance.

2. Participants can enter each competition and vie for the coveted animal olympics medallions (which you can create from wood slugs hanging from yarn).

3. You may wish to print a schedule of events that describe the competitions. Each event is based on realities in the animal world:

Flea Jump:

Who can jump the farthest? A tiny flea placed in the bottom of a tin can will jump out of the can.

Ant Lift:

Who can lift the most logs without dropping any? An ant can lift 23 times its own weight.

Hawk Eye:

Who can find the most hidden objects or peanuts in the grass? Hawks have extremely perceptive vision. It is said a hawk could read a newspaper headline a mile away.

Cheetah Dash:

Who can run the fastest? The cheetah is usually classed as the world's fastest land animal reaching top speeds of sixty miles per hour or more.

Grasshopper Hop:

Who can hop the farthest? A grasshopper can hop over obstacles 500 times its own length.

Snail Sit:

Who can sit down the slowest? Snails are among the slowest animals, often eating their way through obstacles as they go.

Bittern Disguise:

Who can hide the best in a designated area? The bittern is a marsh bird that stands perfectly still with its beak pointed upward to resemble marsh plants.

Owl Tiptoe:

Who can move most quietly (pick a game like Red Light-Green Light or Freeze)? An owl has outer wing feathers that are specifically designed for silent takeoffs and landings.

Mole Crawl:

Who can crawl the fastest through a series of box tunnels? The mole lives underground and burrows just below the surface. Its fur lays easily in any direction to help its mobility in these close quarters.

Mysterious Mammals

When looking for mammals . . .
they're never in view!
Don't get discouraged . . .
THEY'RE watching YOU!

Each of these clues describes a mammal found in Ohio State Parks.

1. As she scrambles about under the moon
   Mom's pouch holds thirteen babies that will fit in a spoon.
   Fifty teeth are really awesome
   And they grow in the mouth of this _____.

2. With tiny ears and eyes
   And always in a hole
   It makes long tunnels for its size
   It's a little fury brown _____.

3. A very common mammal so small
   It is not often in view.
   A fierce insect-eating fur ball
   This little critter in the leaves is a _____.

4. Gray or red
   Running among the rocks
   It may look like a dog
   But it really is a _____.

5. What animal uses teeth, not a beak
   To catch a moth or gnat
   From its radar we hear not a squeak
   So it must be a little flying _____.

6. On his face he wears a mask
His nimble hands are up to any task.
Darkness never comes too soon
For the ornery bushy tailed _____.

7. The mightiest giant he can fell
With just a bit of his old smell.
He will be looking for grubs around a tree trunk
So watch for the black and white _____.

8. Leaping through tree limbs with a twirl
These nut-loving mammals are the red, fox or gray _____.

9. In a deep winter sleep he will lay
Until February 2, his special day.
In a big burrow down by the log
It is the whistlepig or old _____.

10. With mouth pouches stuffed full of seeds
A burrow beneath the rock is all he needs.
Scampering quickly amongst the tree trunks
These little striped critters are _____.

11. Eating tender plants in your garden
Is this long-eared animal's habit.
The young are born blind and naked
Yet quickly grow up to be a _____.

12. He is on the menu of the fox, the hawk and owl
And he's always stealing the feed from the cow.
Living in cornfields, the forest or your house
This little mammal's known as the _____.

13. The antlers he grows when the weather is hot
Are used in the fall rut then shed on the spot.
From him a snort or a grunt you may hear
He is Ohio's official mammal, the white-tailed _____.

Answers for

Mysterious Mammals

1. *opossum*
2. *mole*
3. *shrew*
4. *fox*
5. *bat*
6. *raccoon*
7. *skunk*
8. *squirrel*
9. *groundhog*
10. *chipmunks*
11. *rabbit*
12. *mouse*
13. *deer*

Ohio State Parks Are . . .

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

If you can answer the questions, a very important message will appear above!

1. If litter means "small", put an "L." If it is trash that is not put in a trash can, put a "C."

2. If recycle means use something again, put an "L." If it means ride your bike again, put "I."

3. If everybody should dispose of litter, put an "E." If just trash collectors should pick up litter, put a "T."

4. If litter does not hurt raccoons, put "T." If baby raccoons have trapped their heads in glass jars, put "A."

5. If tangled fishing line should be left at the lake, put "E." If fishing line can strangle ducks and should be put in the trash can, mark "N."

6. If aluminum cans should be recycled, put "B." If aluminum cans should be tossed in bushes, put "R."

7. If paper is made from fleas, mark "B." If paper is made from trees, mark "E."

8. If litter is often carried many miles by wind, put "C." If litter never moves, put "U."

9. If it is okay to toss burning cigarettes on the ground, put "G." If cigarettes should be crushed and put in trash cans, mark "A."

10. If glass bottles can be recycled, mark "U." If glass bottles should be thrown into the lake, mark "D."

11. If it is okay for traveling families to throw gum wrappers out the car window, mark "O." If families should carry litter bags in their cars, mark "S."

12. When you hike, if you should leave only footprints, mark "E." If you should leave the package from your candy bar, mark "I."

13. If "decompose" means write music, put "T." If decompose means breakdown or rot, put "Y."

14. If glass never decomposes if it is tossed on the ground, put "O." If glass rots quickly in soil, put "A."

15. If leaves decompose in soil, mark "U." If leaves never rot, mark "G."

16. If when you are boating, you should save litter and deposit it in a trash can on the dock, mark "C." If it is okay to toss trash in the water, mark "A."

17. If we could save lots of money by depositing our own trash in proper containers, mark "A." If Ohio never spends money for litter to be picked up, mark "I."

18. If newspapers should be left in the street for others to read, mark "N." If newspapers should be recycled, put "R."

19. If litter is everybody's problem, mark "E." If it is okay to walk by litter, mark "X."

Answers to

Ohio State Parks Are . . .

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C	L	E	A	N	B	E	C	A	U	S	E	Y	O	U	C	A	R	E

Team Touch

Materials:
whistle

PURPOSE:

To locate natural items quickly.

This is an active challenge for a small- or medium-sized group.

1. Play "Team Touch" in an area with a variety of natural items.

2. Divide the group into two teams. Have each team line up facing each other about four feet apart.

3. The first person in team #1 calls out the name or color of a common, natural object that is in sight (e.g., acorn, tree, blue).

4. All members of both teams must then run and touch something of that name or color.

5. Team members may not touch the same object.

6. Once they have touched, they should race back to their lineup.

7. The first team to have all its members back in line scores one point.

8. Next, the first player of team #2 calls out an item or color, and everyone races away again. Continue play until all players have had a turn calling out. Add points to determine who won.

9. A whistle can be used to signal "times up" for those searching for an object.

10. Round two can be played in a different location: near a stream, in a field, etc.

Bird Count

Birds are found everywhere: in fields, in forests, on lakes, beside streams... even in STORIES! Underline the birds' names hidden in this story; there are 25. The first is marked as an example.

It was a mystery. A card in Al's house was missing. The card was marked with a pin tailors use in stitching expensive suits. Someone had stolen this valuable item.

"Don't howl," advised Star Lingly, Al's close friend. "We'll find the thief!"

Meanwhile, a friend of Star's, Sue, met Rob in the store. "Did you take the card?"

"Hey, don't go into mourning, dove," replied Rob to Sue. "No one will know it's me."

Sue pleaded, "You've got to return the card! They'll be bitter now if they know it's you."

"I'll give it to her on a platter when I'm ready," Rob retorted.

But, Sue was sure Rob would duck his responsibility. Sue made a plan to rendezvous in a gully with Al, Star and Rob, and force Rob to chat with the others.

The meeting was scheduled for that night. They met under the flickering stars in a place where hunters often kill deer during hunting season.

"O.K.", said Al, "Where's the card?"

"Hey, don't get blue, jay," joked Rob.

"I'm not mocking birds, I want my card!" shouted Al.

"Well, I finally got your goose!" groused Rob. "Your hawk eyes don't miss a thing, do they?" With that, Rob pulled the card from his pocket. The pin was still in the card. Rob handed it to Al.

"I could crown you," said Al. "Why did you take it?"

"That creep, Ernie, dared me to," admitted Rob.

"You were stealing because of him?" challenged Al.

"I'm sorry," swallowed Rob.

Rob promised never to be a turkey and listen to Ernie's crazy plans. Al returned the card to its special box. The gang then went swiftly to Eric's Ice Cream Parlor to shovel Eric's homemade banana splits into their mouths.

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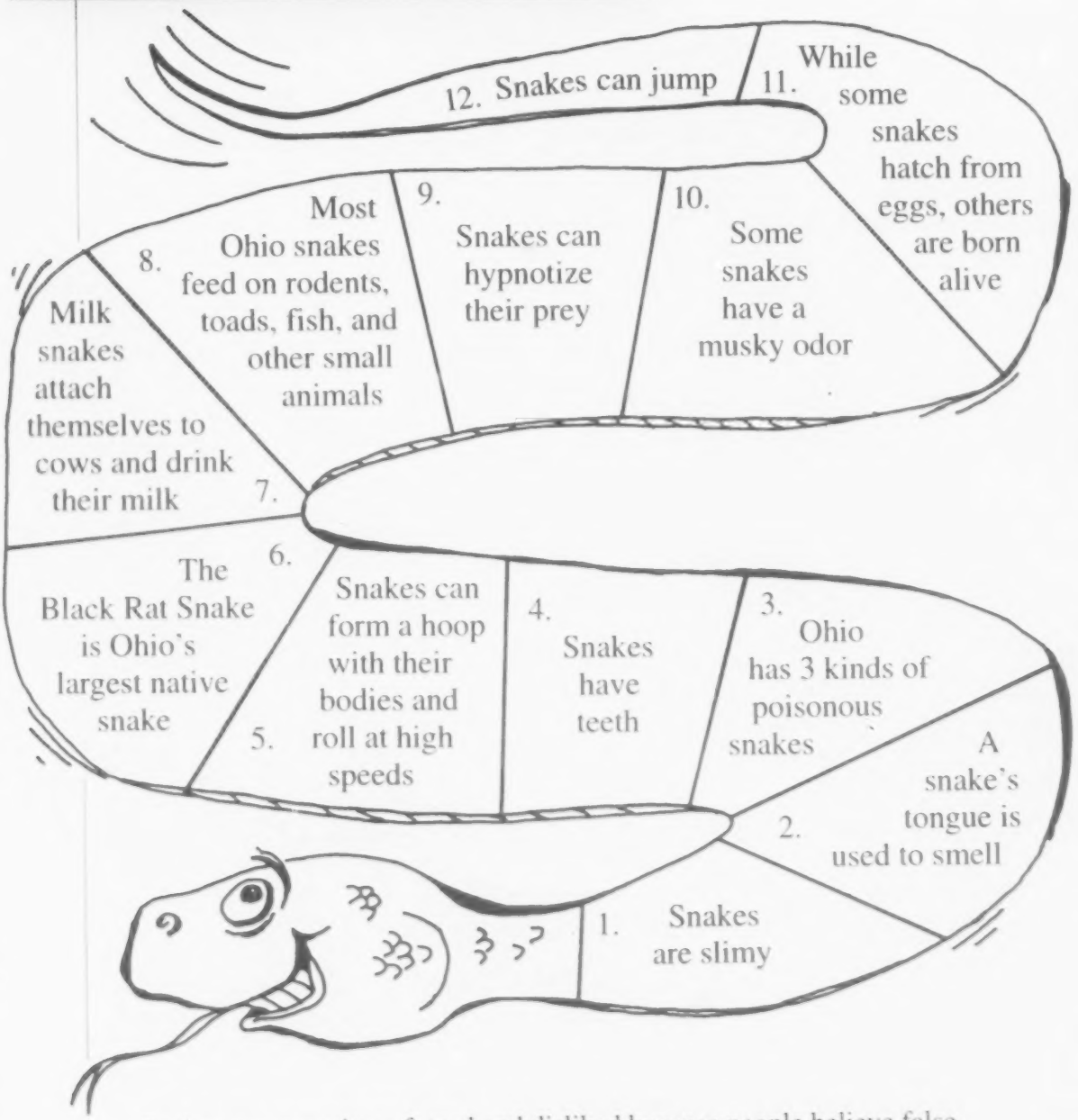
Answers for

Bird Count

Birds Found in Story:

cardinal	gull	hawk
pintail	chat	crow
owl	flicker	creeper
starling	killdeer	teal
robin	bluejay	swallow
mourning dove	mockingbird	turkey
bittern	goose	swift
heron	grouse	shoveler
duck		

Superstitious Snake


12. Snakes can jump
11. While some snakes hatch from eggs, others are born alive
10. Some snakes have a musky odor
9. Snakes can hypnotize their prey
8. Most Ohio snakes feed on rodents, toads, fish, and other small animals
7. Milk snakes attach themselves to cows and drink their milk
6. The Black Rat Snake is Ohio's largest native snake
5. Snakes can form a hoop with their bodies and roll at high speeds
4. Snakes have teeth
3. Ohio has 3 kinds of poisonous snakes
2. A snake's tongue is used to smell
1. Snakes are slimy

Snakes are sometimes feared and disliked because people believe false "facts" about them.

See if you are "Snake Smart" by coloring this snake's scales ORANGE if the statement is **FALSE** and BROWN if the statement is **TRUE**.

Answers for

Superstitious Snake

IT IS TRUE THAT: (color these spaces brown)

2. A snake uses its tongue to pick up scent molecules.
3. Ohio has three poisonous snakes: the copperhead in southeastern Ohio, the timber rattlesnake in southern Ohio, and the massasauga rattler found in swampy areas.
4. Snakes do have rows of tiny teeth.
6. The Black Rat Snake is Ohio's largest native snake. It can grow as long as ten feet.
8. Most Ohio snakes feed on rodents, toads, fish and other small animals. They are a vital link in the food chain as they limit rodent populations.
10. Some snakes have a musky odor. They give it off as a defense.
11. While some snakes hatch from eggs, other are born alive. Snake eggs are oblong-shaped.

IT IS <u>NOT</u> TRUE THAT: (color these spaces orange)

1. Snakes are slimy. Their scaly bodies are dry.
5. Snakes can form a hoop with their bodies and roll at high speeds.
7. Milk snakes can attach themselves to cows and drink their milk. Farmers once believed milk snakes were drinking their cows dry because the snake was found in the barn. But, milk snakes were in the barn to catch mice.
9. Snakes can hypnotize their prey. Some animals will freeze in the presence of a snake.
12. Snakes can jump. They will coil and strike in self defense but do not jump.

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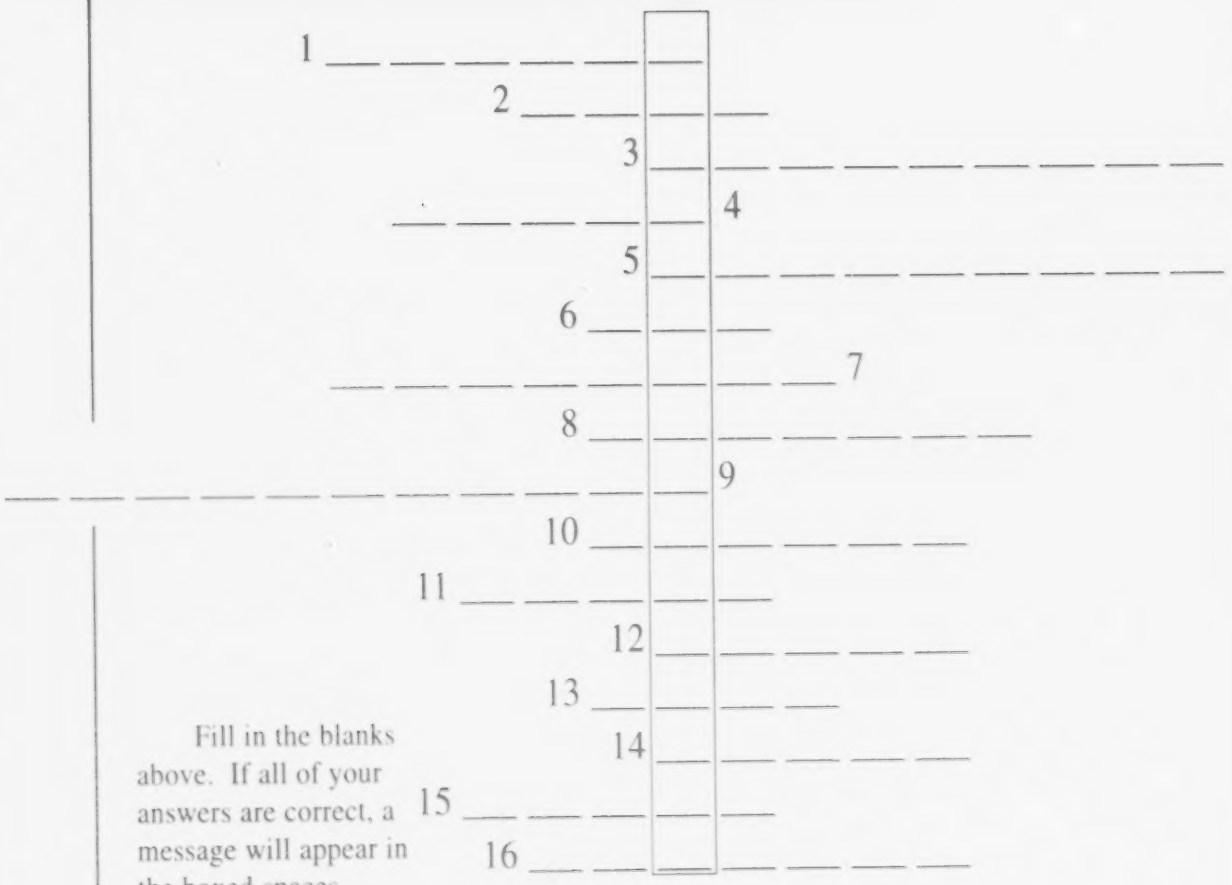
A Message From the Trees



Fill in the blanks above. If all of your answers are correct, a message will appear in the boxed spaces.

1. The nuts from this tree are valuable wildlife food and make a tasty cake!
2. A tree's skin.
3. A tree that never loses its leaves and stays green throughout the winter is called an _____.
4. These trees are tapped in late winter for sweet sap that is boiled into syrup.
5. This tree has three shapes of leaves on its branches: mitten, glove and oval.
6. This sturdy tree drops acorns in the autumn.
7. This animal builds nests of leaves in tree branches.
8. The leaves on a pine tree are called _____.
9. This tree has large thorns on its trunk, and long, brown fruit pods.

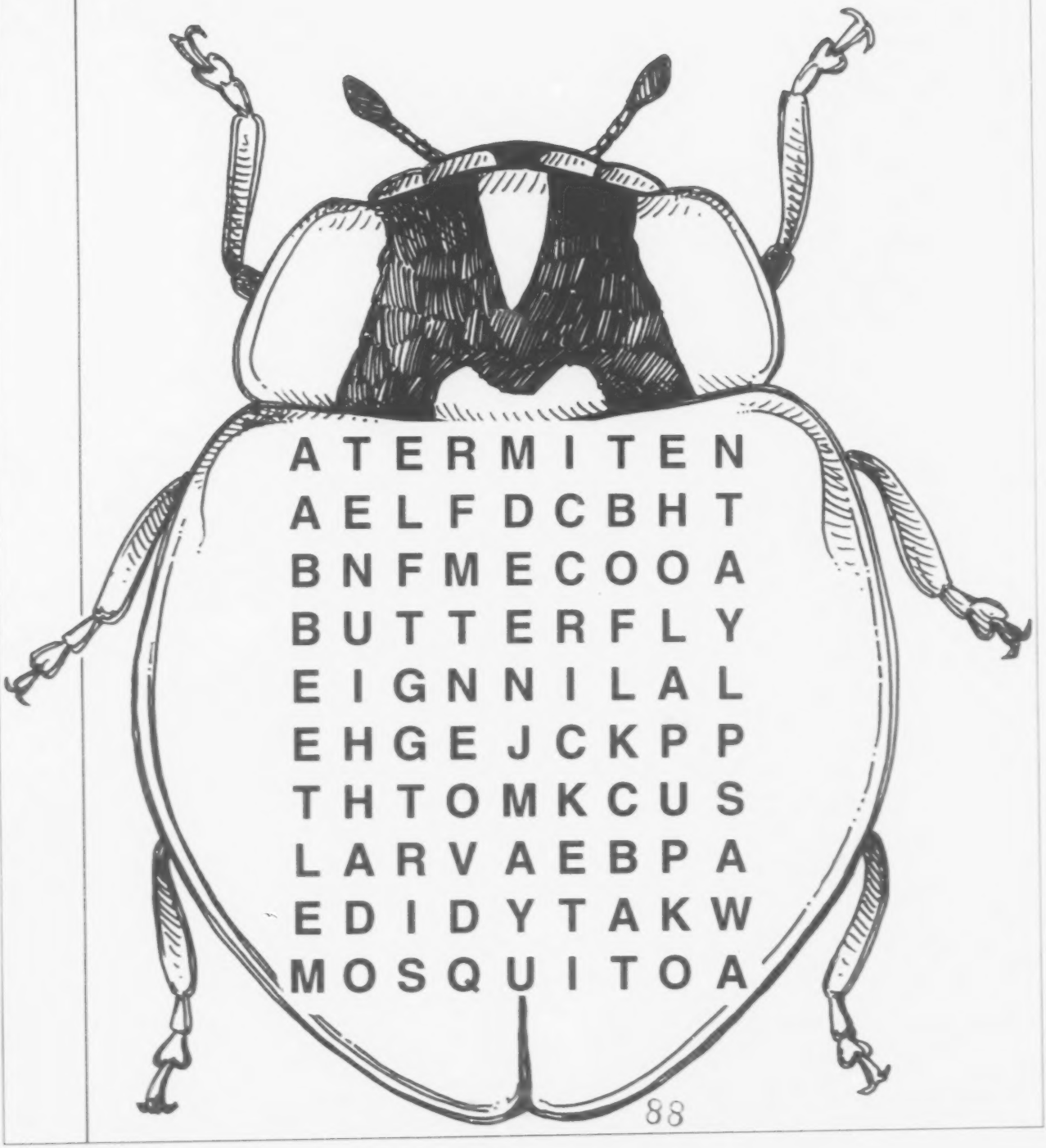
10. Most deciduous trees lose these in the autumn.
11. The middle wood of the tree is called its _____ wood. It gives the tree support.
12. These underground structures supply the tree with water and anchor it in the ground.
13. During the growing season, a tree adds a growth _____ to its trunk. These can be counted to find out the age of the tree.
14. Pine cones, cherries, nuts, apples and acorns are the _____ of trees.
15. Often the tallest, straightest tree in the forest.
16. Ohio's state tree.

Answers to

A Message From the Trees

1 W A L N U **T**
2 B A **R** K
3 **E** V E R G R E E N
M A P L **E** 4
5 **S** A S S A F R A S
6 O **A** K
S Q U I R **R** E L 7
8 N **E** E D L E S
B L A C K L O C U S **T** 9
10 L **E** A V E S
11 H E A **R** T
12 **R** O O T S
13 R **I** N G
14 **F** R U I T
15 T U L **I** P
16 B U **C** K E Y E

Find 16 Insects Before They Fly Away!



Answers for

Find 16 Insects Before They Fly Away!

Park Pursuit

Materials:

"Park Pursuit" cards, pencils, facility maps or brochures

PURPOSE:

To get acquainted with park facilities

Although some people return to the same park annually, many are first-time visitors. The printed maps and park literature acquaint visitors with park facilities. This activity is designed as an icebreaker and a chance to discover, firsthand, park operations and people. It can be easily adapted to a resident outdoor eduction camp scenario or the school land lab.

1. Before meeting the group, design "Park Pursuit" cards that emphasize the area (sample cards included). You will need to make an answer key at the time you design the cards.

2. Explain to participants that today they will be playing "Park Pursuit, Camper's Edition." They will be given a set of "Park Pursuit" cards for which they will have to find answers. Their answers can be written on the back of the cards.

3. Participants will work in pairs, and off-limit areas should be clearly defined. If children are too young for this format, "Park Pursuit" can be used as a family activity or with teachers and other adults.

4. To score "Park Pursuit", give each player a "Park Pursuit" sheet. Go over each question and the correct answers. For every correct answer, players should circle one footprint.

5. Award each player who makes it to the Naturalist's Office an official "Park Pursuit Ranger Award."

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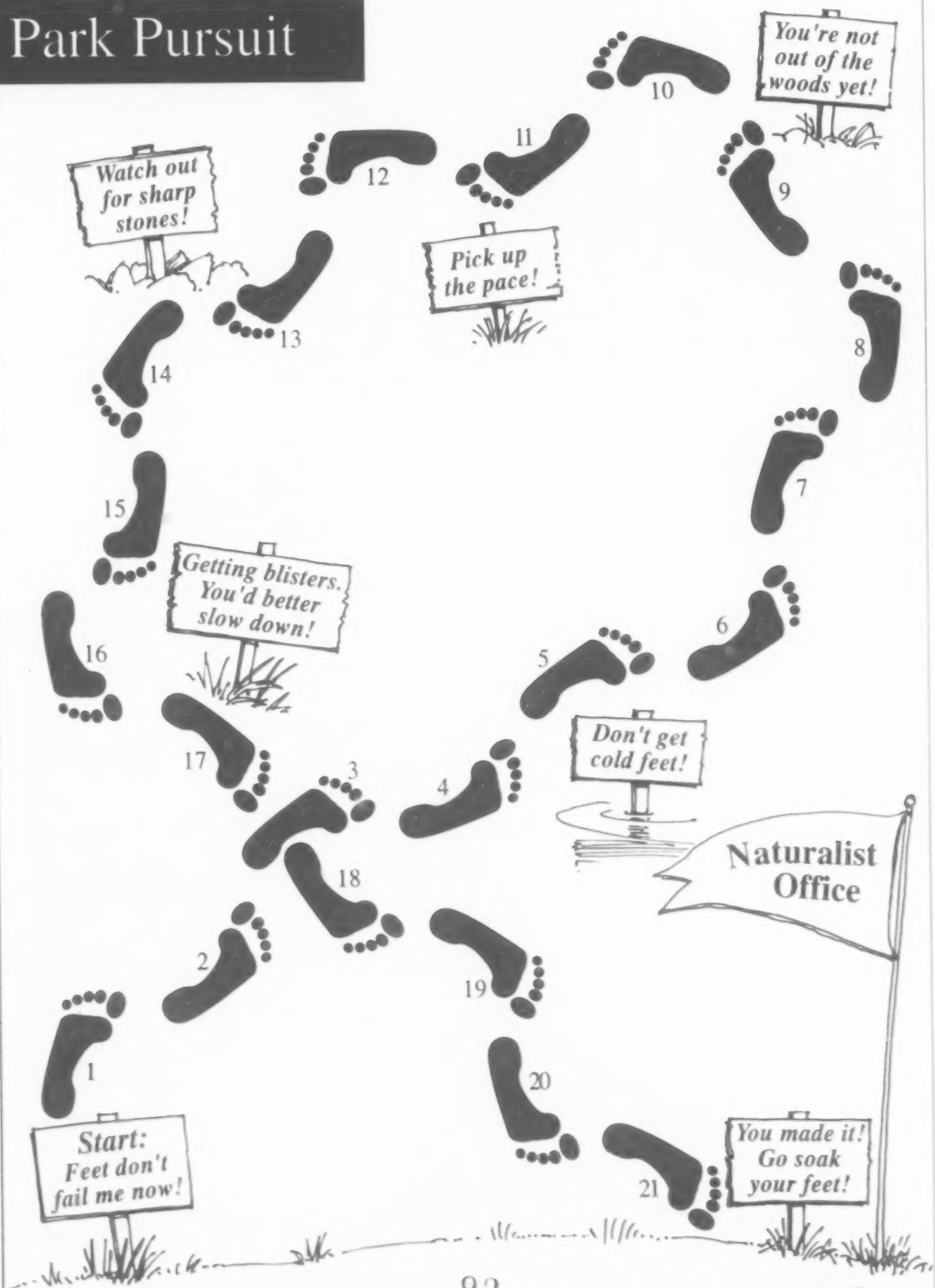
PARK PURSUIT CARDS	
How much does it cost to rent a rowboat for one hour?	Where would you go in the park to buy fishing bait?
What is the speed limit in the park?	Where can you swim in the park?
Is there a pop machine in the park?	For whom was the park named?
What is the name of one hiking trail in the park?	What time must visitors who are not camping leave the park?
Are the picnic tables chained to the ground?	Does the park have cabins that are rented to the public?
Name one sport you can enjoy in the park in the winter.	How many acres of land are in the park?
Do the trash cans have lids?	Does the concession stand sell M & M's?
How many campsites are there in Class A camping?	Who is the lifeguard on duty at the beach?
How many nights can you camp at one time?	Is there a playground in the park?

Park Pursuit



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A Puzzling Butterfly

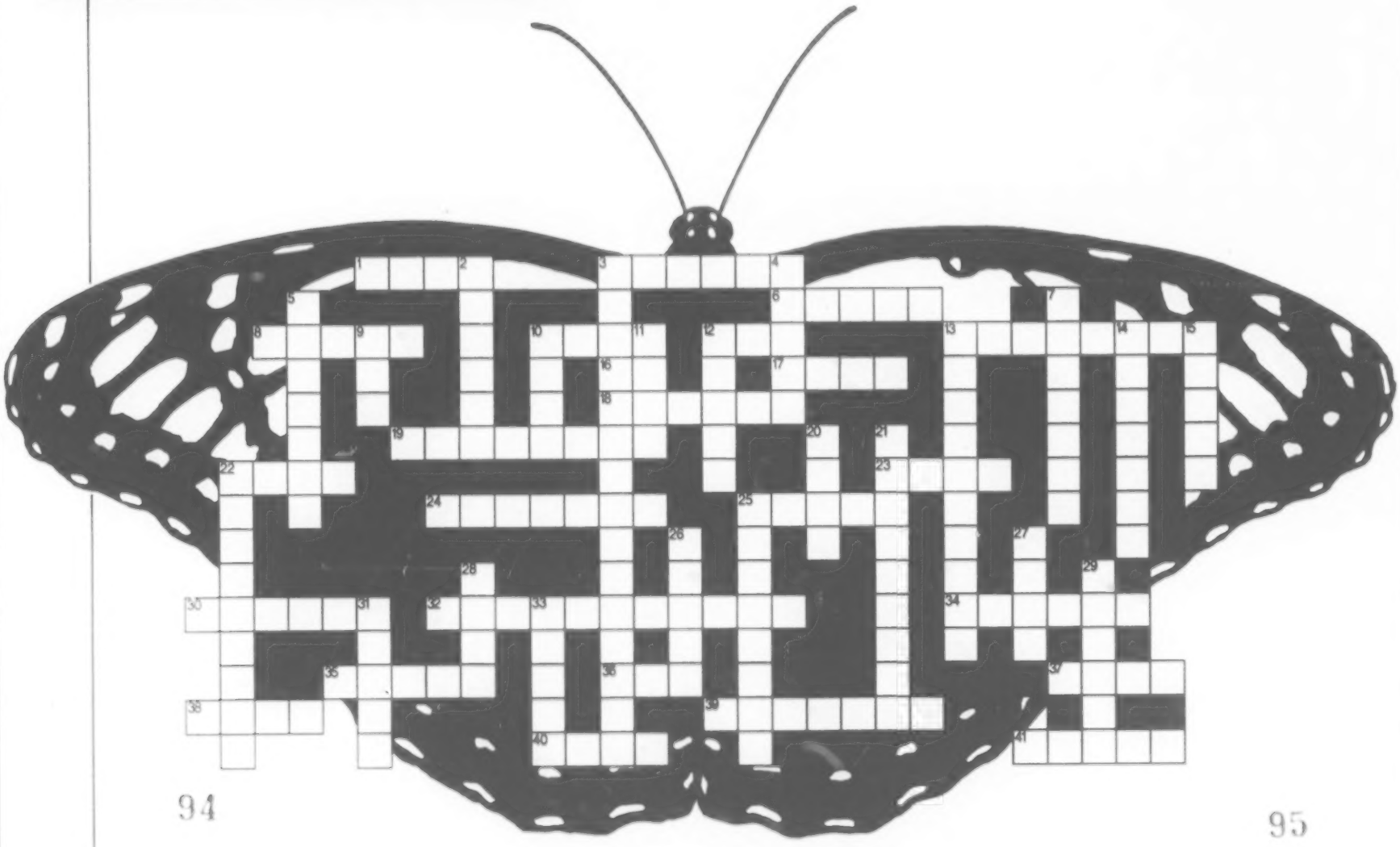
Across

1. to let fall
3. small log buildings for short visits
6. country house or inn
8. sandy place to swim
10. what you burn in a campfire
12. stinging insect that makes honey
13. tree-climbing, acorn-eating rodent
16. abbreviation for opposite of north
17. white-tailed _____
18. small pieces of left-over food
19. to hike carrying your gear on your back
22. sport: hitting small ball into hole with club
23. to set up tents or trailers for outdoor stay
24. pouched animal that plays dead when trapped
25. paddle in a _____
30. long, legless reptiles
32. places to set up tents or trailers
34. discarded trash or refuse
35. swimming birds with webbed feet
36. maple tree fluid used to make syrup
37. white flakes that fall during blizzards
38. owl call
39. swimming animal with whiskers and gills
40. to move your body through water
41. excess material

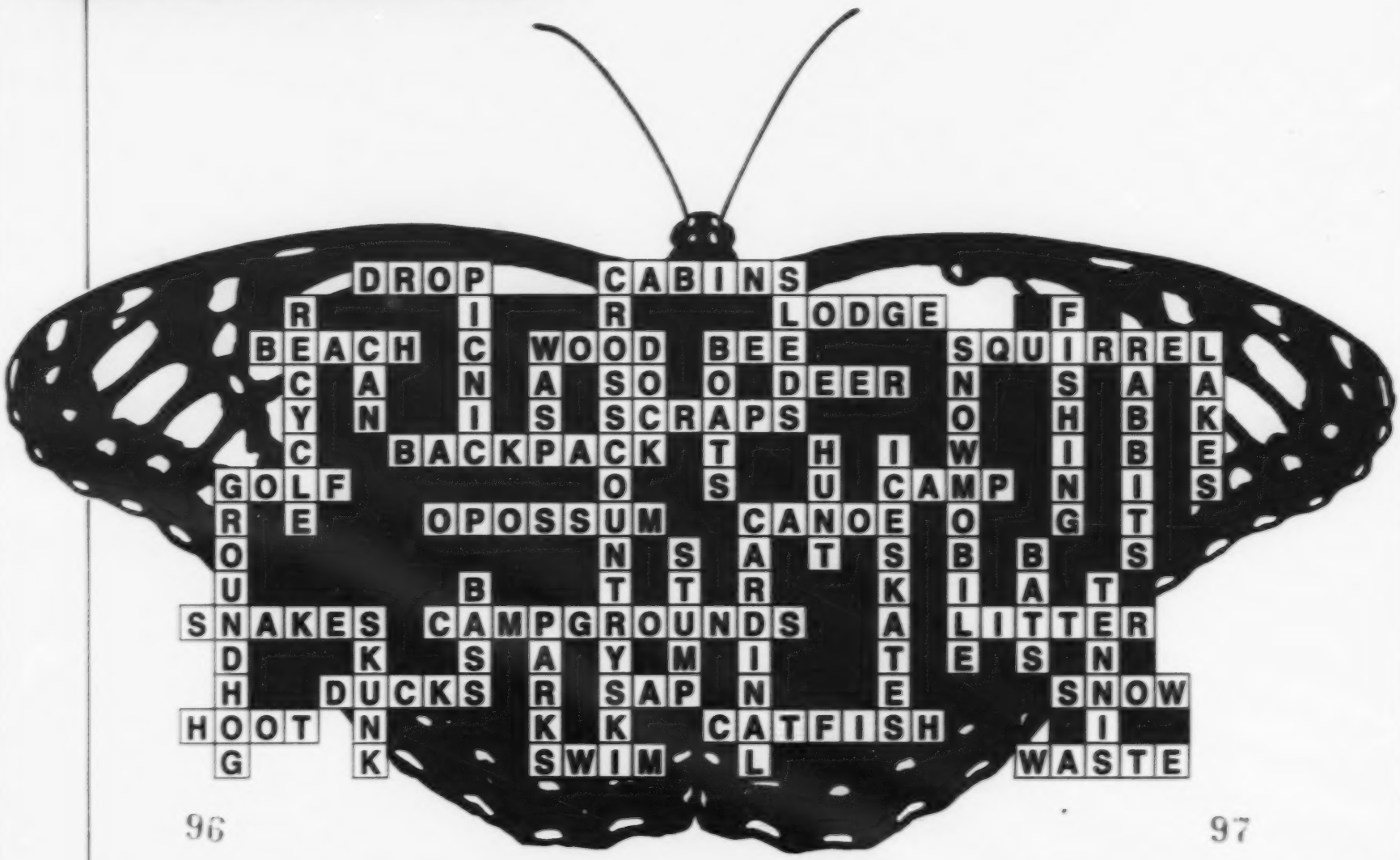
Down

2. to eat a meal outdoors
3. sport: to move across snow using poles and skinny wood strips
4. used to slide downhill on snow
5. to return used cans, bottles and paper to use again
7. using a line, pole and hook to catch #39 Across
9. common beverage container
10. stinging insect that builds a paper hive
11. tie your boat to the wooden _____
12. small ships
13. machine used to travel across piles of #37 Across
14. adult bunnies
15. large ponds
20. to capture wildlife using guns or bow-and-arrows
21. shoes with blades on the bottom
22. woodchuck or "whistle-pig"
25. red-bird, Ohio state bird
26. lower part of a tree after trunk cut off
27. flying nighttime mammal that lives in caves and attics
28. common fish, example: large-mouth
29. sport: hitting a ball across net with webbed racket
31. smelly, black animal with white stripe on back
33. public recreation areas

A Puzzling Butterfly



A Puzzling Butterfly Answers


DROP CABINS
R I R LODGE F
BEACH C WOOD BEE SQUIRREL
C A N A SO O DEER N S A LAKE
Y N I S SCRAPS O H B K
C BACKPACK T H I W I B E
GOLF O S U CAMP N I S
R E OPOSSUM CANOE O G T
O N S A T S B B S
U B T T R K I A T
SNAKES CAMPGROUNDS A LITTER
D K S A Y M I T E S N
H DUCKS R SAP N E SNOW
HOOT N K K CATFISH I
G K SWIM L WASTE

Home Habits

Animals

1

1. Although raccoons prefer hollow trees for dens, they can also be found living in drainpipes, abandoned groundhog holes, old buildings, and farm machinery. Some cities have raccoon populations living in their sewer systems.

2. White-footed mice groom themselves but not their homes. Their nests, which can be found under boards and logs, in hollow trees, in underground tunnels, and even in abandoned bird nests, often become so smelly from discarded food and scat that the nest must be abandoned.

3. Because there are fewer barns and proper habitat, the barn owl is being threatened. With many of its preferred nesting sites gone, it is listed as an endangered species in Ohio.

4. Pileated woodpeckers chisel nesting cavities in living trees . . . somehow realizing that live trees are more secure than dead ones.

5. Mole hills are a result of a secondary tunnel system the mole constructs as a passageway to its feeding grounds. This passage is built six inches to two feet deep, and since the soil cannot be shoved aside or upward, it must be loosened and pushed out of the tunnel.

Camouflage

Animals

2

1. The concept of camouflage was first noticed in 1890 by Sir E. Patton . . . until then, people thought animal colors and patterns were by chance.

2. The salt and pepper moth evolved to an all-black moth when the industrial revolution blackened the tree trunks where it fed.

3. Some animals are disguised as offensive things to predators: grass blades, stones, bird scat, pine needles, bark and lichens.

4. Treehoppers have shields that resemble scat, ants, cocoons and thorns.

5. A brightly colored insect is probably bitter to taste.

6. When inchworms are frightened they freeze in a position that resembles a twig. To keep its body taut, the inchworm extends tiny silk threads to support itself.

7. Some animals that aren't dangerous act dangerous to intimidate predators. The scarlet king snake is avoided since it looks like a coral snake. The robber fly looks and acts like a bumblebee although it does not have the ability to sting.

Home Habits

6. Termites must maintain contact with soil moisture in order to survive. Therefore, they live in underground colonies and build passageways of mud into buildings so they are not exposed to dry air or sunlight.

7. Snakes do not make holes but adapt to other available spaces.

Camouflage

8. Viceroy butterflies use mimicry and avoid being eaten. The Viceroy looks like the bitter-tasting Monarch butterfly.

9. Many animals have lighter coloring on their undersides to blend with the sky if being viewed from below. Their backs are darker to camouflage from predators above them. A common aquatic insect called the back-swimmer swims belly-up, and this scheme of dark and light coloring is reversed.

How Old Is Old?

Animals & Plants

3

1. Trees are living history. Find trees that represent various dates or count tree rings on a stump to emphasize the historians in the forest:

1866: Lincoln shot
1869: Alaska purchased
1878: Custer's last stand
1904: The Wright brothers fly
1917: World War I
1928: Charles Lindbergh crosses the Atlantic
Shoes cost $1.00
1937: Jesse Owens in the Berlin Olympics
1941: World War II
1968: First man on the moon (Neil Armstrong)
1974: Skylab

2. Large animals tend to live longer than small animals. Small mammals have small hearts that pump faster than big ones and therefore "wear out " faster.

3. Most age span records are set in zoos. Few animals die of old age in the wild.

Strange Senses

Animals

4

1. You can smell a skunk even if you smell just .000,000,000,000,071 of its spray.

2. A tick smells with its front legs.

3. A slug has eyes on the ends of the longer pair of fleshy stalks that extend from its head. The shorter pair is used to smell.

4. The snake smells with its forked tongue.

5. A housefly tastes with its feet.

6. In the insect world, dragonflies have the best eyesight. Some have over 25,000 separate lenses in each eye. Houseflies have over 4,000 lenses per eye.

7. Insects use antennae to feel, smell and sometimes hear.

8. The bumps on our tongues contain 9,000 taste buds.

9. Great horned owls hoot at middle "C". This sound is inaudible to English sparrows, starlings and pigeons.

10. By cupping their ears forward with their hands, kids can see how much louder sounds can become . . . a copy of deer and rabbit ears.

How Old Is Old?

4. Age of fish is determined by counting ridges on their scales (much like rings of a tree).

5. The common box turtle can live to be 100 years old.

6. Minnows live about 1 year. Fish bigger than 1' often live four to five years.

7. Birds-of-prey live long lives; eagles can live to 46 years.

8. The bristlecone pine may be the oldest living thing on earth with reports of some that are between 4,000 and 5,000 years old.

Strange Senses

11. Wetting the tip of the nose makes it more sensitive to smells.

12. A catfish can taste with its tail, whiskers and other body parts.

Seeds and Pollen

Plants

5

1. Each jewelweed fruit contains about 20 seeds that have a walnut like taste. When ripe, the fruits may shoot the seeds as far as 7 feet.
2. Sugar maple fruits are called "keys".
3. Poison ivy seeds and others cannot grow unless they are eaten by birds, passed through their digestive tracts and excreted.
4. Most plants that are pollinated by wind produce small, insignificant flowers since they don't need to attract insects. In contrast, wind-pollinated plants produce great quantities of pollen.
5. Some seeds are carried by birds in little balls of mud that cling to their legs and feet.
6. Research has found that one square foot of high grass produces about eight million grains of pollen.
7. Goldenrod produces heavy pollen that must be carried by insects. Although we often blame it for our hayfever miseries, the real culprit is ragweed which matures at the same time. One giant ragweed plant can produce 8,000,000,000 grains of wind blown pollen.

Locomotion

Animals

6

1. Grasshoppers have 100 more muscles than people.
2. Fleas can jump 13" (nearly 200 times the length of their bodies).
3. Kangaroos can jump farther than any other animal: 42'. Man can jump 29'.
4. In a running race, here is how the animals would finish:

1st place . . .	Cheetah	(71 mph)
2nd place . . .	Deer	(50 mph)
3rd place . . .	Cat	(40 mph)
4th place . . .	Wolf	(30 mph)
5th place . . .	Person	(27 mph)
6th place . . .	Mouse	(8 mph)
7th place . . .	Snail	(.03 mph)

5. Ants can lift up to 50 times their own weight.
6. The peregrine falcon has the speed record for the animal world having been clocked as it dives through the air at over 200 miles per hour.
7. It has been estimated that a hummingbird can fly the width of the Gulf of Mexico during migration on an amount of calories equal to one pat of butter.

Solid Waste Estimates*

Recycling

7

1. In one day, the average citizen of the U.S. generates 4.4 pounds of solid waste, of which 22% (one pound) is recycled.

2. Each year, the sanitation system of the U.S. receives in consumer refuse (not counting industrial waste):

78 million tons of paper
14 million tons of glass
17 million tons of metals
19 million tons of plastics
14 million tons of food waste
33 million tons of yard waste
14 million tons of wood waste
19 million tons of other wastes: leather, textiles

(In 1993, recyclers recovered 45 million tons of resources from the total 208 million tons of consumer solid waste generated)

Folklore and Fact

Animals

8

1. Count the number of cricket chirps in 15 seconds and add 38 to determine the temperature in degrees-Fahrenheit.

2. Earthworms are so afraid of moles that any vibration will send them to the surface--which is how fishermen often collect bait.

3. Moles are not blind, although their tiny eyes are not important beneath the ground. Their noses are not used for digging--it's their front feet that dig the tunnels.

4. A large population of groundhogs (woodchucks) was said to be a sign of prosperity during the Depression because the people were not having to use them for meat. The groundhog spends almost ¾ of its life asleep. The groundhog's sleeping den is set higher than the main tunnels to guard against flooding.

5. Some people believe woolly bear caterpillars, larvae of the Isabella moth, can predict the severity of winter: The narrower the reddish brown band, the colder and longer winter will be. A wide red band indicates a mild, short winter. Some even say that if the black band in front is wider than at the rear, the first part of winter will be the most severe.

Solid Waste Estimates*

Recycling

3. In 1978, each person in the U.S. used an average of :

   650 pounds of paper
   46 pounds of copper, lead, and zinc
   18,504 pounds of building materials
   55 pounds of aluminum
   15 tons of minerals
   1359 pounds of steel

*** These figures are estimates from 1993. Remember, these figures have changed and will continue to change. For instance, the 22% of recycled solid waste per person is up from estimates of less than 7% per person in 1978. So, you can make a difference!**

Folklore and Fact

Animals

6. Some folk sayings:

   - Stare at a toad's eyes, and your eyes will turn green.
   - Witches live in the elderberry bush.
   - A snapping turtle won't let go 'til the sun goes down.
   - Take off your hat and bow toward a cawing crow to prevent bad luck.
   - When the cows lay down, bad weather's comin' 'round.

9

A square foot of grass is a complete mini-ecosystem unto itself. Here are some facts about some of its components:

1. Dandelions are well-adapted plants that can grow tall to overshadow or stay short to avoid mowers and grazers.

2. Spider silk is stronger in tensile strength than steel. Spiders can be important predators in a tiny ecosystem.

3. It takes 300-1,000 years for one inch of top soil to be built.

4. There are about 8,000 species of ants. Some ants capture and keep slaves of another ant species.

5. Earthworms do not have eyes, but light sensitive cells near its head tell it to go underground when exposed to the sun. Worms eat their way through the soil as they fertilize with their castings and help to aerate.

6. Slugs leave a protective mucous path with their bodies which could allow them to walk across broken glass. The name "slug" is from "suggae" which means lazy.

7. Many backyard "weeds" such as dandelions and plantain are not native species but arrived here with European settlers.

Endangered Species

Animals & Plants

10

1. Over 1,000 kinds of wildlife are threatened with extinction; more than 100 are native to the United States.
2. Animals that once roamed Ohio that are now gone include the puma, timber wolves, bison, prairie chicken and elk.
3. The last passenger pigeon was "Martha" who resided in the Cincinnati Zoo and died there September 1, 1914.
4. Although the passenger pigeon was once the most abundant bird in the world, it became extinct in one human generation. Decline in forests, low biotic potential (one egg per clutch) and uncontrolled hunting are reasons for its extinction.
5. Over ½ of the mammal species now extinct have disappeared since the year 1900.
6. About 59,000 square miles of forest land are lost every year.
7. Many species of plants may become extinct before they are discovered.

Amazing Insects

Animals

11

1. There are over a million different kinds of insects.
2. Insects make up 78% of all organisms and weigh 12 times more than the entire human race.
3. Insects could be the key to survival if lost in the woods. Where chicken is 27% protein and beef is 25% protein, ants are 14% protein, housefly pupae are 64% and locusts are 50-75% protein.
4. In a single meal, a female mosquito can drink her own weight in blood.
5. A cockroach can live nine days without its head.
6. There are more insects in 1 square mile of rural land than human beings on the entire earth.
7. Scientists discover between 7,000 and 10,000 insect species every year.
8. There are about 8,000 species of ants. Some capture "slaves" of other insect species. Ants can lift 18 to 20 times their own body weight.
9. Many cultures use insects as food. Grasshoppers can be dried and ground into flour for "bread", many insects are fried or roasted, Mexico cans and exports "Gusanos" (large white grubs) and some species are brewed into beverages.

Eating Habits

Animals

12

1. The average American adult eats 1,445 pounds of food per year: 815 pounds in crops, 630 pounds of animal meat--a total of 4 pounds of food daily.
2. White-tailed deer feed on 614 different kinds of plants.
3. Meadow mice eat ½ of their weight in food each day.
4. Shrews eat at least their body weight in food daily.
5. Some baby birds are fed once every four minutes--their parents bring 200 meals daily.
6. Swallows eat the equivalent of 1,000 mosquitoes each day.
7. Flickers eat the equivalent of 5,000 ants daily.
8. The all-time eating champ is the polyphemus moth caterpillar that eats food 86,000 times its birth weight during the first 24 days.
9. French writer Jules Michelet said, "If it weren't for the birds, no human could live upon the earth for the insects upon which the birds live would destroy all vegetation."

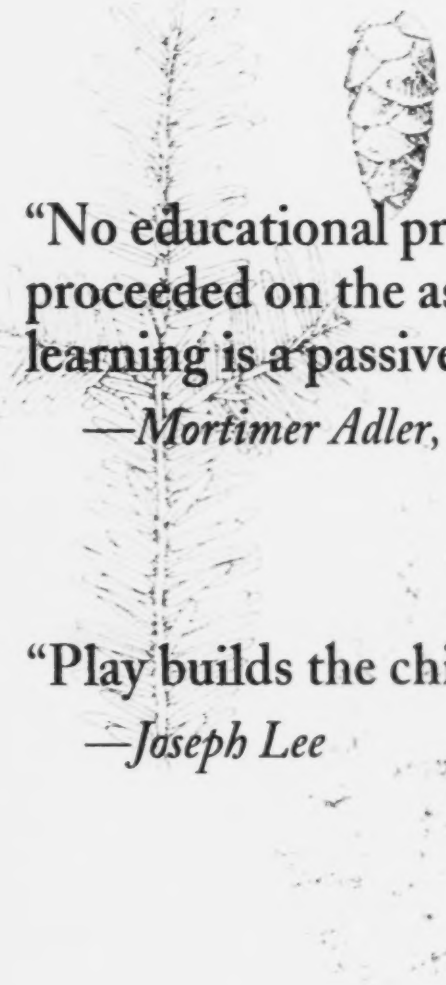
Tree Trivia

Plants

13

1. Every year in the U.S., each person uses enough tree products to make up a tree 100' tall and 16" in diameter.
2. An acre of trees can remove about 13 tons of dust and gases every year from the surrounding environment.
3. Human bones are actually stronger than the wood of an oak tree.
4. About half the wood cut in the world each year is burned as fuel.
5. Some 85 species of birds and 49 species of mammals use tree cavities in the U.S. for homes: chickadees, wrens, screech owls, wood ducks, woodpeckers, and raccoons are examples.
6. Tree bark is used for making many important things such as insulation and stuffing, insecticide, chemical products, oils, sugars, polish, pectins, gums, resins, tannin and nitrogen compounds.
7. The early American forest was so extensive, is has been said that a squirrel could travel through the canopy for 1,000 miles in one direction without touching the ground.

Projects



"No educational program ever proceeded on the assumption that learning is a passive affair."

—Mortimer Adler, Psychologist

"Play builds the child."

—Joseph Lee

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Class Projects

Following are a few ideas for class projects. Some can be extended for several weeks or throughout the year. The numbers listed after each are for activities in the Activity Section that can be used to support them.

1. Develop a feeding station outside your window to attract birds and other wildlife. You can stretch bird seed by added cracked corn to the mix. Don't forget that birds also need water through the winter and grit for digesting (crushed eggshell will work). **Activities 4, 6, 9, 11, 12**
2. Make arrangements with a local store or restaurant to let students draw environmental messages or designs on their merchandise bags or placemats. **Activities 2, 3, 5, 7, 8, 9, 13**
3. Bring in newspapers and magazines which students can look through to find words from the list in Portapark. Lead discussions on the associated articles. Where? Who? Why? **Activities 3, 5, 9, 12, 13**
4. Earthworms are interesting creatures which are easily kept. Consider starting a worm ranch. (This can be done in a wash tub.) You can find reference materials in many libraries on their care. The references can also supply ideas on experiments and activities which employ these critters. **Activities 2, 4, 6, 8, 10, 11**
5. Set up a question box in the classroom. Students can write to ask facts that they want to know about nature. When the box fills, pass these out as reference or research exercise.
6. Have your class keep articles throughout the year that help to describe their "society." At the end of the year, they can incorporate these articles into a burial mound (sand pile). Next year's class begins the same project by first excavating this mound and writing as archeologists about their predessors. **Activities 2, 3, 5, 7, 8, 9, 12, 13**
7. Adopt an area around the school and patrol for litter. Consider coordinating this activity with a student campaign or recycling program. **Activities 2, 3, 5, 7, 8, 9, 13**
8. If you have access to a camera, take pictures through the year that can cover a story, such as "birds at our feeder," "How our window garden grew," etc. At year's end, let students develop a storybook or slide program from these photos that can be shown to other classes.
9. Build a diarama of a natural scene with moveable parts. Divide the class into teams, each assuming different roles (i.e.--farm family, contracting firm, family of raccoons, etc.). Each group has a chance to develop a plan and revise the diarama to meet their needs and desires. When all have had their turn, let them

discuss how each affected the others. What changes or compromises can follow? **Activities 3, 5, 6**

10. Mount a white sheet outside your window and a black light inside so that it shines on the sheet. Turn the light on at night during the warmer months. In the morning you are likely to find an interesting array of moths and insects on the sheet. **Activities 6, 10, 11**
11. Bring a frozen, dead log inside to keep in a box with screened top. As it thaws, record changes and see what types of life may emerge. **Activities 2, 5, 6, 8, 10**
12. Have students develop a list of questions they would like to know about what the area looked like before they were born. How plants may have been used in an earlier era, etc. Then, through the year, invite grandparents or friends from the local senior center to class for student interviews. **Activities 5, 7, 12**